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III

CHAPTER VII.

REPORT

UPON

THE COLLECTIONS OF HYMENOPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1872, 1873, AND 1874.

BY

E. T. CRESSON.

WITH

LIST OF FORMICIDAE.

BY

EDWARD NORTON.

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5 Je 20 J. B. Childs

CHAPTER VII.

1. TENTHREDO SEMIRUFUS.

Tenthredo semirufus, NORTON, Proc. Ent. Soc. Phila., iii, 12.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

2. TENTHREDO VARIEGATUS.

Tenthredo variegatus, NORTON, Proc. Ent. Soc. Phila., iii, 12.

1 ♂ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

3. UROCERUS AREOLATUS.

Urocerus areolatus, CRESS., Trans. Am. Ent. Soc., i, 375.

1 ♀ specimen; Colorado; Dr. H. C. Yarrow.

4. UROCERUS EDWARDSII.

Urocerus Edwardsii, BRULLÉ, Hym., iv, 645, pl. 45, f. 1.

1 ♀ specimen; Arizona; Jas. M. Rutter.

5. UROCERUS CYANEUS.

Sirex cyaneus, FAB., Ent. Syst., ii, 127.

1 ♀ specimen; New Mexico; J. Alborn.

6. UROCERUS ALBICORNIS.

Sirex albicornis, FAB., Ent. Syst., ii, 127.

1 ♀ specimen, with bright orange-yellow wings; New Mexico; J. Alborn.

7. UROCERUS FLAVICORNIS.

Sirex flavicornis, FAB., Ent. Syst., ii, 126.
Sirex bizonatus, STEPH., Kirby, Fn. Bor.-Am., iv, 256.

3 ♀ specimens; Eastern Colorado; 1873; Dr. J. T. Rothrock; New Mexico; Dr. H. C. Yarrow.

8. TREMEX COLUMBA.

Sirex columba, LINN., Syst. Nat., ii, 929.

1 ♀ specimen, with abdomen pale yellow, with five narrow black fasciæ; South Arizona; H. W. Henshaw: 1874.

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9. ICHNEUMON SUTURALIS.

Ichneumon suturalis, SAY, Bost. Jour. Nat Hist., i, 226.

2 ♂ ♀ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

10. TROGUS MELLOSUS, *sp. nov.*

♂.—Large, honey-yellow, opaque; head and antennæ lemon-yellow, tips of the latter and of mandibles black; mesothorax with a brownish longitudinal stripe on each side over tegulæ; scutellum and tegulæ pale honey-yellow, the former convex, shining, finely punctured; metathorax with sharply defined carinæ, the disk elevated, central area lunate, shining; wings yellow, apical margin fuscous, nervures and stigma honey-yellow; legs yellow, femora honey-yellow; abdomen velvety, paler on apical middle of segments; basal incisure of third segment narrowly black; apex of first segment with a prominent shining tubercle on summit. Length, 12 lines.

1 specimen; New Mexico; collected by T. V. Brown?, 388.

11. OPHION MACRURUM.

Ichneumon macrurus, LINN., Mant., 540.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

12. OPHION BILINEATUS.

Ophion bilineatus, SAY, Contrib. Macl. Lyc., i, 75.

11 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

13. OPHION PURGATUS.

Ophion purgatus, SAY, Bost. Jour. Nat. Hist., i, 238.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

14. CRYPTUS CALIPTERUS.

Cryptus calipterus, SAY, Bost. Jour. Nat. Hist., i, 234.

1 ♀ specimen; Arizona; 1873; H. W. Henshaw.

15. FORMICA PENNSYLVANICA.

Formica pennsylvanica, DE GEER, Ins., iii, 603.

2 ♀ specimens; Colorado, Arizona; 1873; H. W. Henshaw.

16. FORMICA RUFA.

Formica rufa, LINN., Syst. Nat., ii, 962.

2 ♂ specimens; Colorado; 1873; H. W. Henshaw.

17. MUTILLA OAJACA.

Mutilla oajaca, BLAKE, Trans. Am. Ent. Soc., iii, 228.

2 ♂ specimens; Colorado; Dr. H. C. Yarrow.

18. MUTILLA ORCUS.

Mutilla orcus, CRESS., Proc. Ent. Soc. Phila., iv, 428.

4 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona (1294); Dr. J. Rothrock.

19. MUTILLA MAGNA.

Mutilla magna, CRESS., Proc. Ent. Soc. Phila., iv, 385.

1 ♀ specimen; Arizona; Jas. M. Rutter.

20. MUTILLA AUREOLA.

Mutilla aureola, CRESS., Proc. Ent. Soc. Phila., iv., 385.

2 ♀ specimens; New Mexico; Dr. Oscar Loew.

21. MUTILLA BIOCULATA.

Mutilla bioculata, CRESS., Proc. Ent. Soc. Phila., iv, 431, ♂.

♀.—Black; occiput, thorax above, and first large abdominal segment above clothed with a long, dense, yellowish-ferruginous pubescence; remainder of the body and legs clothed with black pubescence. Length, 7 lines.

4 ♂ ♀ specimens: Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

22. MUTILLA FULVOHIRTA.

Mutilla fulvohirta, CRESS., Proc. Ent. Soc. Phila., iv, 433.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

23. MUTILLA URSULA.

Mutilla ursula, CRESS., Trans. Am. Ent. Soc., v, 120.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

24. MUTILLA CALIFORNICA.

Mutilla californica, RAD., Blake, Trans. Am. Ent. Soc., iii, 235.

12 ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow: Arizona; 1873; Dr. J. T. Rothrock: New Mexico; H. W. Henshaw.

25. MUTILLA COCCINEOHIRTA.

Mutilla coccineohirta, BLAKE, Trans. Am. Ent. Soc., iii, 235.

1 ♂ specimen; Arizona; 1873; Dr. J. T. Rothrock.

26. MUTILLA AEGINA.

Mutilla Ægina, CRESS., Proc. Ent. Soc. Phila., iv, 435.

11 ♀ specimens; Arizona; 1873; Dr. J. T. Rothrock: New Mexico; Dr. H. C. Yarrow.

27. MUTILLA GORGON.

Mutilla gorgon, BLAKE, Trans. Am. Ent. Soc., iii, 233.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

28. MUTILLA SACKENI.

Mutilla Sackeni, CRESS., Proc. Ent. Soc. Phila., iv, 385.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

29. MUTILLA FENESTRATA.

Mutilla fenestrata, ST. FARG., Hym., iii, 627.

3 ♂ specimens; New Mexico; Dr. H. C. Yarrow, W. G. Shedd.

30. MUTILLA SIMILLIMA.

Mutilla simillima, SMITH, Brit. Mus. Cat. Hym., iii, 62.

6 ♀ specimens; New Mexico; Dr. H. C. Yarrow.

31. AGAMA TAPAJOS.

Agama Tapajos, BLAKE, Trans. Am. Ent. Soc., iii, 262.

1 ♂ specimen; Arizona; 1874; H. W. Henshaw.

32. AGAMA ALCANOR.

Agama alcanor, BLAKE, Trans. Am. Ent. Soc., iii, 264.

1 ♂ specimen; New Mexico; Dr. Oscar Loew.

33. AGAMA NITIDA, *sp. nov.*

♂.—Pale chestnut-brown, polished, very sparsely punctured, clothed with a long, scattered, pale pubescence; antennæ and tegulæ pale testaceous; postscutellum with a central pit; disk of metathorax with a shallow longitudinal depression, slightly striated at base; wings hyaline, faintly tinged with yellowish; nervures and stigma fuscous; marginal cell very short, appendiculated at tip; second submarginal cell triangular, petiolated; third submarginal cell large, subquadrate; abdomen very feebly punctured; basal segment petiolate, gradually dilated to tip; disk faintly sulcate; venter tinged with fuscous. Length, 5–6½ lines.

3 specimens; Colorado; Lieutenant C. W. Whipple. This is allied to *Alcanor*, Blake.

34. AGAMA GLABRELLA.

Mutilla glabrella, CRESS., Proc. Ent. Soc. Phila., iv, 414.

5 ♂ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow.

35. AGAMA ALBIPES, *sp. nov.*

PLATE XXXIII, FIG. 2.

♂.—Uniform dark honey-yellow, clothed with a long, thin, pale pubescence, more dense on abdomen; sparsely punctured; metathorax closely and rather coarsely reticulated; mandibles pale, with black tips and long hairs: palpi pale; antennæ yellowish-white; scape with long hairs; wings pale yellowish-hyaline; marginal cell with a fuscous cloud, rather narrow, about equal in length with the stigma, truncate at tip; second submarginal cell subtriangular; the third subquadrate, slightly narrowed beneath; legs entirely yellowish-white, clothed with a long whitish pubescence; abdomen more or less tinged with fuscous, ovate, petiolate; the petiole long, much swollen beyond the middle, strongly and rather closely punctured; the apex strongly constricted. Length, 5–5½ lines. (Trans. Am. Ent. Soc., 1875.)

4 ♂ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

36. MYZINE SEXCINCTA.

Scolia sexcincta, FABR., Syst. Ent., 356.

9 ♂ specimens; New Mexico; 1873; Dr. Oscar Loew: Colorado; Dr. H. C. Yarrow.

37. MYZINE HAMATA.

Myzine hamatus, SAY, Bost. Jour. Nat. Hist., i, 300.

3 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

38. MYZINE FRONTALIS, *sp. nov.*

♀.—Black; narrow anterior orbits confluent with a broader transverse line immediately above antennæ, line behind the eyes, a spot on disk of occiput, prothorax above, subquadrate spot on disk of mesothorax, a cuneiform spot on each side over tegulæ, scutellum except basal margin, postscutellum, two spots on pleura, metathorax except two black approximate spots on posterior face, a black spot on each side at base, spot on all the

femora, spot on posterior coxæ, anterior tibiæ in front, broad band on five basal segments above with posterior margin more or less sinuate, and lateral spots on second, third, and fourth ventral segments, all bright lemon-yellow; wings hyaline, costal margin tinged with yellowish, nervures fulvous; abdomen smooth, polished, sparsely punctured, terminal segment opaque black, longitudinally aciculated, apical margin narrowly dark rufous, tip rounded and subcrenulated. Length, 6½ lines.

1 ♀ specimen; New Mexico; collected by Dr. H. C. Yarrow.

39. MYZINE HYALINA.

Myzine hyalina, CRESS., Proc. Ent. Soc. Phila., iv, 442.

12 ♂ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance.

40. TIPHIA ALBILABRIS.

Tiphia albilabris, ST. FARG., Hym., iii, 556.

11 specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

41. SCOLIA HAEMATODES.

Scolia hæmatodes, BURM., Abh. Nat. Ges. Halle, i, 33.

15 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Arizona; H. W. Henshaw.

42. SCOLIA LECONTEI.

Scolia Lecontei, CRESS., Trans. Am. Ent. Soc., i, 376.

13 ♂ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

43. ELIS XANTIANA.

Elis Xantiana, SAUSS., Ann. Soc. Ent. Fr., 4e sér., iii, 18.

2 ♀ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

44. ELIS ZONARIA.

Elis zonaria, CRESS., Trans. Am. Ent. Soc., i, 378.

8 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

45. POMPILUS ÆTHIOPS.

Pompilus æthiops, CRESS., Proc. Ent. Soc. Phila., iv. 451.

1 ♂ specimen; Colorado; Wm. H. Hance.

46. POMPILUS ATROX.

Pompilus atrox, DAHLB., CRESS., Trans. Am. Ent. Soc., i, 98.

1 ♀ specimen; Arizona; Henry Johnson.

47. POMPILUS MARGINATUS.

Pompilus marginatus, SAY, Long's 2d Exped., ii, 333.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

48. PRIOCNEMIS TEXANUS.

Priocnemis texanus, CRESS., Trans. Am. Ent. Soc., iv, 204.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

49. PRIOCNEMIS TERMINATUS.

Pompilus terminatus, SAY, Am. Ent., pl. 42.

1 ♀ specimen; Arizona; H. W. Henshaw.

50. PEPSIS CAERULEA.

Sphex cærulea, LINN., Syst. Nat., i, 497.
Pompilus formosus, SAY, Am. Ent., pl. 42.

Numerous ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; Jas. M. Rutter.

51. PEPSIS ORNATA.

Pepsis ornata, ST. FARG., Hym., iii, 486.

10 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow: Arizona; Jas. M. Rutter.

52. AMMOPHILA YARROWI, *sp. nov.*

♂.—Black; head and thorax covered with a rather long, dense, silvery-cinereous pubescence; metathorax with an elongate, black, transversely aciculated space on each side of disk; tegulæ fulvous, black anteriorly; wings hyaline, slightly dusky at tip; legs black, covered with very fine sericeous cinereous scales; tibiæ sometimes varied with ferruginous; abdomen: the petiole long and very slender, the second joint except upper edge, and the first, second, and sides of third segments, ferruginous. Length, 11 lines.

2 ♂ specimens; Pueblo, Colorado; collected by Dr. H. C. Yarrow.

53. AMMOPHILA PRUINOSA.

Ammophila pruinosa, CRESS., Proc. Ent. Soc. Phila., iv, 455.

15 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow.

54. AMMOPHILA VARIPES.

Ammophila varipes, CRESS., Proc. Ent. Soc. Phila., iv, 457.

8 ♂ ♀ specimens; Colorado, New Mexico, Dr. H. C. Yarrow, Lieutenant C. W. Whipple.

55. AMMOPHILA VULGARIS.

Ammophila vulgaris, CRESS., Proc. Ent. Soc. Phila., iv, 458.

6 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Colorado; Lieut. C. W. Whipple.

56. AMMOPHILA ROBUSTA.

Ammophila robusta, CRESS., Proc. Ent. Soc. Phila., iv, 461.

6 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: New Mexico; J. Alborn.

57. AMMOPHILA LUCTUOSA.

Ammophila luctuosa, SMITH, Brit. Mus. Cat., iv, 224.

8 ♂ ♀ specimens; Colorado; 1873; Dr. J. T. Rothrock: Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

58. PELOPOEUS CEMENTARIUS.

Sphex cementaria, DRURY, Ins., i, 105.

7 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow.

59. PELOPOEUS CAERULEUS.

Sphex cærulea, LINN., Syst. Nat., i, 941.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; 1873; Dr. J. T. Rothrock.

60. PELOPOEUS TEXANUS.

Pelopœus texanus, CRESS., Trans. Am. Ent. Soc., iv, 210.

1 ♀ specimen; Arizona; 1873; H. W. Henshaw.

61. CHLORION CAERULEUM.

Sphex cærulea, DRURY, Ins., ii, 75.

1 ♀ specimen; Arizona; 1873; Dr. J. T. Rothrock and H. W. Henshaw.

62. SPHEX LAEVIVENTRIS.

Sphex læviventris, CRESS., Proc. Ent. Soc. Phila., iv, 463.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

63. SPHEX RUFIVENTRIS.

Sphex rufiventris, CRESS., Trans. Am. Ent. Soc., iv, 211.

1 ♀ specimen; New Mexico; Dr. Oscar Loew.

64. SPHEX ICHNEUMONEA.

Sphex ichneumonea, LINN., Syst. Nat., ii, 959.

5 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

65. PRIONONYX ATRATA.

Sphex atrata, ST. FARG., Hym., iii, 355.

9 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Wm. H. Hance.

66. PRIONONYX THOMAE.

Sphex Thomæ, FABR., Ent. Syst., ii, 199.

8 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Arizona; H. W. Henshaw.

67. TACHYTES ABDOMINALIS.

Larra abdominalis, SAY, West. Quar. Rep., ii, 77.

5 ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Wm. H. Hance.

68. ASTATA UNICOLOR.

Astata unicolor, SAY, Long's 2d Exped., ii, 337.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

69. BEMBEX SAYI.

Bembex Sayi, CRESS., Proc. Ent. Soc. Phila., iv, 467.

2 ♂ specimens; New Mexico; Dr. H. C. Yarrow.

70. BEMBEX FASCIATA.

Bembex fasciata, FABR., Syst. Piez., 224.

9 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow: New Mexico; H. W. Henshaw.

71. STIZUS GRANDIS.

Stizus grandis, SAY, Am. Ent., pl. 2.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

72. STIZUS NEVADENSIS, *sp. nov.*

PLATE XXXIII, FIG. 1.

♂.—Black; middle of face, clypeus, labrum, mandibles except tips, anterior orbits ending in two dots within the ocelli, tubercles, narrow posterior margin of prothorax, sometimes narrow line over tegulæ, and a band or two spots on scutellum, both sometimes wanting, yellow; base of antennæ ferruginous; tegulæ dull honey-yellow, with a yellow spot anteriorly; thorax with a very short, dense, changeable pile; wings pale yellowish-fuscous; marginal cell darker; costa more deeply tinged with yellow; legs ferruginous, sometimes more or less black at the base; anterior femora beneath, four anterior tibiæ exteriorly, and base of posterior tibiæ, yellow; abdomen shining, pale yellow above; base of first segment and basal and apical margin of all the segments narrowly black; on each side of first segment anteriorly an oblique, generally bifurcate, black mark; anterior margin of second segment more or less undulate, and on each side anteriorly a rounded black spot; a short, oblique, black line on each side of second and third, and sometimes fourth, segments posteriorly; the yellow band on fifth, and sometimes fourth, segments deeply indented with black on each side anteriorly; sixth segment with a large, transverse, yellow mark; apical segment black, tipped with ferruginous; the anal spine rather long and acute; sometimes the base of second segment is ferruginous; venter black, sometimes varied with ferruginous; a yellow band on posterior margin of second segment deeply indented laterally; three following segments with a lateral yellow line or spot. Length, 10–12 lines. (Trans. Am. Ent. Soc., 1875.)

3 specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow. The prevailing color of the dorsal segments of abdomen is a pale yellow; the bands occupying nearly the entire width of the segments, leaving only a narrow, black margin at base and apex; the basal margin of the yellow on first segment is more or less sinuous.

73. LARRA UNICINCTA.

Stizus unicincta, SAY, West. Quar. Rep., ii, 77; Am. Ent., pl. 2.

8 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

74. PHILANTHUS VENTILABRIS.

Philanthus ventilabris, FABR., Ent. Syst., suppl., 268.

3 ♀ specimens; Colorado; Wm. H. Hance: New Mexico; Dr. H. C. Yarrow.

75. CERCERIS FRONTATA.

Cerceris frontata, SAY, West. Quar. Rep., ii, 80.

2 ♀ specimens; Colorado; Dr. H. C. Yarrow.

76. CERCERIS BICORNUTA.

Cerceris bicornuta, GUÉR., Icon. Règ. Anim., 443, ♀.
Cerceris Dufourii, GUÉR., Icon. Règ. Anim., iii, 444, ♂.
Cerceris venator, CRESS., Proc. Ent. Soc. Phila., v, 116, ♂.

11 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow.

77. CERCERIS SEXTA.

Cerceris sexta, SAY, Bost. Jour. Nat. Hist., i, 382.

2 ♀ specimens; Colorado; Wm. H. Hance.

78. MASARIS VESPOIDES.

Masaris vespoides, CRESS., Proc. Ent. Soc. Phila., ii, 69.

1 ♂ specimen; Colorado; 1873; Dr. J. T. Rothrock.

79. ODYNERUS CAPRA.

Odynerus capra, SAUSS., Rev. Mag. Zoöl., 1857, 273.

2 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

80. EUMENES COLORADENSIS, *sp. nov.*

♀.—Black; rather densely clothed with a short, pale pubescence; apex of clypeus, two oblique spots on upper margin (sometimes nearly confluent with apical spot), clavate spot between antennæ, dot behind summit of each eye, scape beneath, anterior margin of prothorax, dot beneath wings, dot on each side of scutellum, postscutellum, a round spot on each side of metathorax at base, apex of femora, anterior pair beneath, all the tibiæ, dot on each side of first segment of abdomen above, its narrow and wavy apical margin, a transverse, rather oblique mark of variable size on each side of second segment, its broad, apical margin (narrowed laterally, sometimes deeply indented on anterior middle, sometimes entire, inclosing a black dot),

apical margin of remaining segments above and beneath (more or less indented laterally above), and a large quadrate mark on apex of second ventral segment, lemon-yellow; tarsi pale ferruginous; tegulæ yellowish, pupilled with fulvous; wings subhyaline, with costæ of anterior pair yellowish-fuscous; marginal cell fuscous. Clypeus elongate, convex at base, flattened at apex, which is deeply emarginate, the surface shining, with a few large, scattered punctures; thorax densely and deeply punctured; abdomen shaped much like that of *fraterna*, densely punctured, clothed with a dense, yellowish, sericeous pile, very conspicuous in certain lights; lateral tubercle on first segment distinct. Length, 5½ lines.

♂.—Varies considerably in markings; clypeus entirely lemon-yellow; band on post scutellum sometimes interrupted medially; dot on each side of first abdominal segment generally wanting; lateral mark on second segment varies considerably both in length and breadth; the broad apical margin sometimes indented; hook at tip of antennæ ferruginous and very acute; the pubescence of the body is longer and more dense than in ♀, and the sericeous pile on abdomen more conspicuous. Length, 5–6 lines.

5 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow. This is allied to *verticalis*, Say, but is less robust and more densely pubescent; ♀ clypeus narrower, with apex more deeply emarginate.

81. ODYNERUS ANNULATUS.

Odynerus annulatus, Say, Long's 2d Exped., ii, 348.

43 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance, Almont Barnes: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

82. ODYNERUS DUCTUS.

Odynerus ductus, Cress., Trans. Am. Ent. Soc., iv, 238.

5 ♂ specimens; New Mexico; Dr. H. C. Yarrow.

83. ODYNERUS ANORMIS.

Eumenes anormis, Say, Long's 2d Exped., ii, 346.

2 ♂ specimens; Arizona; 1873; H. W. Henshaw: Colorado; Dr. H. C. Yarrow.

84. ODYNERUS TAOS.

Odynerus taos, CRESS., Trans. Am. Ent. Soc., i, 381.

15 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Almont Barnes: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

85. PTEROCHILUS 5-FASCIATUS.

Pterochilus 5-fasciatus, SAY, Long's 2d Exped., ii, 347.

4 ♂ specimens; Colorado; Dr. H. C. Yarrow, Almont Barnes: New Mexico; Dr. Oscar Loew; H. W. Henshaw.

86. POLISTES CANADENSIS.

Vespa canadensis, LINN., Syst. Nat., i, 952.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

87. POLISTES NAVAJOE.

Polistes Navajoe, CRESS., Trans. Am. Ent. Soc., i, 383.

7 ♂ ♀ specimens; Arizona; Jas. M. Rutter, Henry Johnson.

88. POLISTES FLAVUS.

Polistes flavus, CRESS., Trans. Am. Ent. Soc., i, 383.

6 ♂ ♀ specimens; Arizona; Jas. M. Rutter: New Mexico; Dr. H. C. Yarrow, Wm. G. Shedd, Gilbert Thompson.

89. POLISTES AURIFER.

Polistes aurifer, SAUSS., Mon. Guêpes Soc., 78.

8 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

90. POLISTES VARIATUS.

Polistes variatus, CRESS., Trans. Am. Ent. Soc., iv, 247.

7 ♂ ♀ specimens; New Mexico; 1873; Dr. Oscar Loew, Dr. H. C. Yarrow: Colorado; Dr. H. C. Yarrow.

91. VESPA MACULATA.

Vespa maculata, LINN., Syst. Nat., ii, 948.

1 ♀ specimen; New Mexico; Dr. Oscar Loew.

92. VESPA OCCIDENTALIS, *sp. nov.*

PLATE XXXIV, FIGS. 1, 2.

♀.—Black; clypeus, mandibles except tips, large triangular mark on front, anterior orbits filling the sinus, broad posterior orbits, scape in front,

large elongate mark on each side of prothorax in front of tegulæ, a triangular spot beneath wings, two large transverse spots on scutellum, band on postscutellum interrupted medially, sometimes two spots on metathorax, and sometimes two small spots on mesothorax posteriorly, lemon-yellow; clypeus rather broader than long, with a black dot on middle; the apex broadly and rather deeply emarginate; the lateral angles prominent; eyes and base of mandibles contiguous; tegulæ yellow, pupiled with black or brown; wings pale fuscous; legs lemon-yellow; base of femora more or less black; abdomen lemon-yellow; first segment with a black spot on each side anteriorly, not inclosed, and a large triangular one on the middle; base of second, and the three following, segments, more or less broadly black, deeply indenting the yellow medially, and with a black spot on each side of the middle; apical segment black, with a large, triangular, black spot on each side; venter yellow, with a transverse, black spot on each side; second segment broadly black at base, confluent with the lateral black spot; the yellow band, occupying the apical half of this segment, divided by a black, median stripe. Length, 8½ lines. (Trans. Am. Ent. Soc., 1875.)

♂.—Resembles the ♀ in markings, except that the apical yellow bands on second and three following segments are much narrower and acutely indented medially and squarely on each side of the middle; the black spots not inclosed. Length, 6 lines.

23 ♀ ♂ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: New Mexico; 1873; H. W. Henshaw, Dr. H. C. Yarrow, Dr. Oscar Loew: Colorado; Dr. H. C. Yarrow, Lieut. C. W. Whipple.

Distinguished at once from *germanica* by the scape of antennæ being yellow beneath, and by the different ornamentation of the first abdominal segment.

93. HALICTUS TRIZONATUS, *sp. nov.*

PLATE XXXIII, FIG. 3.

♀.—Black; finely, not densely punctured, clothed with a pale, griseous pubescence, more dense on face, cheeks, sides of thorax, postscutellum and sides of metathorax; scutellum shining; inclosed space at base of metathorax finely, longitudinally rugose; tegulæ brown; wings hyaline, tinged with yellow; veins honey-yellow; subcostal nerve black; legs black, with

short, dense, griseous pubescence; abdomen rather short, ovate, convex, smooth, and shining; base and sides with a long, thin, griseous pubescence; second, third, and fourth segments each with a broad band of short, dense, white pubescence; anal rima fulvous. Length, 4½ lines. (Trans. Am. Ent. Soc., 1875.)

1 specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

94. HALICTUS DISPARILIS.

Halictus disparilis, CRESS., Trans. Am. Ent. Soc., iv, 253.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

95. AGAPOSTEMON TEXANUS.

Agapostemon texanus, CRESS., Trans. Am. Ent. Soc., iv, 255.

6 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

96. AGAPOSTEMON TRICOLOR.

Agapostemon tricolor, ST. FARG., Hym., ii, 289.

14 ♂ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow: New Mexico; Dr. H. C. Yarrow; H. W. Henshaw; Dr. Oscar Loew.

97. AGAPOSTEMON MELLIVENTRIS, *sp. nov.*

PLATE XXXIII, FIG. 4.

♀.—Golden-green, very densely punctured, clothed with a pale ochraceous pubescence; anterior margin of clypeus, and mandibles except tips, which are black, yellow; antennæ black; scape at base and beneath pale yellow; flagellum testaceous beneath; metathorax coarsely reticulated, sometimes tinged with blue, the truncate apex inclosed by a nearly semicircular carina; tegulæ pale yellow; wings pale yellowish-hyaline; nervures pale; legs yellowish, with pale ochraceous pubescence; coxæ and base of femora black, more or less tinged with green; abdomen ovate, clothed above with a short, pale sericeous pile, very dense at base of the segments; the fourth segment has a narrow, black band across the middle, and the following segment more or less tinged with black; beneath, the apical segments are more or less blackish. Length, 4½ lines. (Trans. Am. Ent. Soc., 1875.)

3 specimens. Easily recognized by the green head and thorax and the fulvous abdomen.

98. NOMIA NORTONI.

Nomia Nortoni, CRESS., Trans. Am. Ent. Soc., i, 385.

1 ♀ specimen; Colorado; Dr. H. C. Yarrow.

99. NOMIA NEVADENSIS, *sp. nov.*

PLATE XXXIV, FIGS. 3, 4.

♀.—Head and thorax black, rather densely clothed with a short ochraceous pubescence; three or four basal joints of antennæ, and sometimes the middle of face and clypeus, fulvous; scutellum and metathorax fulvo-ferruginous; on sides of thorax, the pubescence is long and dense, and short and dense on anterior part of mesothorax, on posterior margin, and on postscutellum; basal space of metathorax inclosed by a well-defined carina, and longitudinally rugose; tegulæ pale honey-yellow; wings yellowish, with apical margin broadly fuliginous; legs fulvous, with dense ochraceous pubescence; abdomen fulvous; apical margin of the segments depressed, pale, and fringed with ochraceous pubescence; venter fringed with long, ochraceous pubescence. Length, 5½ lines. (Trans. Am. Ent. Soc., 1875.)

♂.—Less robust, and more densely pubescent, especially on the face; posterior femora much swollen and curved; their tibiæ dilated inwardly at tip, which has a stout, obtuse tooth; the margin above rather deeply emarginate; middle of first and second abdominal segments deeply and transversely excavated, the third less deeply so; fourth and fifth segments, except apical margins, black, the third sometimes tinged with black. Length, 5–5½ lines. (Trans. Am. Ent. Soc., 1875.)

8 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

The pubescence is doubtless much faded from being long immersed in alcohol.

100. EUNOMIA MARGINIPENNIS, *sp. nov.*

♀.—Entirely black or brown-black; head and abdomen shining; thorax clothed with a short, dense, velvety-black or brown pubescence; legs generally brown, with sericeous pubescence on tibiæ; inclosed space behind postscutellum coarsely rugose; metathorax coarsely punctured; wings yellowish-hyaline, with apical margins broadly fuliginous; abdomen depressed above, with little or no pubescence, finely punctured; base deeply excavated. Length, 8 lines.

♂.—Very different from ♀, the body being clothed with a brownish-ochraceous pubescence, paler on the face; apical joint of antennæ enlarged and much flattened; legs shining; anterior tibiæ and tarsi fringed behind with long, ochraceous pubescence; intermediate femora much swollen, produced beneath into a sharp, bisinuate edge, their tibiæ short, simple, their tarsi long, slender; posterior femora clavate, being swollen at tip, their tibiæ short, triangular, flattened, undulate beneath, the apex beneath dilated and truncate or subbilobate, their tarsi slender, nearly as long as the femora and tibiæ together; first joint very long, longer than the remaining joints together; wings as in ♀; abdomen narrower than in ♀, more convex above, the depressed apical margin of the segments testaceous; all the segments above covered with a short, brownish-ochraceous, sericeous pubescence; venter flat, smooth, and shining. Length, 8½ lines.

5 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, W. G. Shedd. This is congeneric with *heteropoda*, Say; the males of both species having the apex of antennæ dilated and flattened, and the same formation of legs. I therefore separate them from our other species under the generic name given above. The *N.? apacha*, Cress., of which the ♀ only is known, and which resembles the ♂ of *marginipennis* very closely in color, also belongs to this genus.

101. MEGACILISSA YARROWI, *sp. nov.*

♀.—Black; head, thorax, legs, and basal segment of abdomen clothed with a rather long, dense, ochraceous pubescence; wings subhyaline, dusky beyond the cells; apical margin of second, third, and fourth segments of abdomen with a narrow continuous band of white pubescence; two apical segments entirely black; venter with ochraceous pubescence; four anterior tibiæ and all the tarsi black. Length, 9 lines.

2 ♀ specimens; New Mexico; Dr. H. C. Yarrow.

102. PANURGUS? ÆTHIOPS.

Panurgus æthiops, Cress., Trans. Am. Ent. Soc., iv, 259.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

103. MACROTERA ALBIPENNIS.

Perdita? albipennis, CRESS., Trans. Am. Ent. Soc., i, 386.

3 ♀ specimens; New Mexico; Dr. Oscar Loew.

104. MONUMETHA BOREALIS.

Monumetha borealis, CRESS., Proc. Ent. Soc. Phila., 1864, 388.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

105. MONUMETHA ARGENTIFRONS.

Monumetha argentifrons, CRESS., Proc. Ent. Soc. Phila., 1864, 387.

1 ♂ specimen; Colorado; 1873; Dr. J. T. Rothrock. This is probably the ♂ of *borealis*.

106. OSMIA BUCEPHALA.

Osmia bucephala, CRESS., Proc. Ent. Soc. Phila., 1864, 17.

1 ♀ specimen; Colorado; 1873; Dr. J. T. Rothrock.

107. LITHURGUS APICALIS, *sp. nov.*

♀.—Black; the face with a transverse ridge, with the sides elevated into a prominent obtuse tubercle, and beneath a large, quadrate, flattened, smooth, shining space, having a few large scattered punctures; at base of antennæ, down the sides of the face, and on the margin of the clypeus covered with dense, whitish pubescence; that on the latter intermixed with fulvous; cheeks, sides of thorax and of metathorax, and postscutellum clothed with long, whitish pubescence; thorax convex, densely and rather coarsely rugose; wings subhyaline; legs clothed with a pale pubescence; that on tarsi beneath fulvous; abdomen depressed, much flattened and excavated at base, shining, finely and closely punctured on the sides, smooth on the disk of the segments, the apical margins of which have a narrow band of white pubescence, generally interrupted medially; apical segment above densely covered with a fulvo-fuscous pubescence; ventral scopa dense and whitish. Length, 6–8 lines.

2 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, C. E. Aiken. This is closely allied to *gibbosus*, SM., also found in Colorado, but is readily distinguished by the fulvous apex of the abdomen; in *gibbosus*, the apical segment is black.

108. MEGACHILE PRUINA.

Megachile pruina, SMITH, Brit. Mus. Cat., i, 190.

10 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

109. MEGACHILE DISPARILIS.

Megachile disparilis, CRESS., Trans. Am. Ent. Soc., iv, 264.

1 ♂ specimen; New Mexico; H. W. Henshaw.

110. ANTHIDIUM MACULIFRONS.

Anthidium maculifrons, SMITH, Brit. Mus. Cat. Hym., ii, 214.

1 ♂ specimen; Colorado; Almont Barnes.

111. ANTHIDIUM EMARGINATUM.

Megachile emarginata, SAY, Long's 2d Exped., ii, 352.

2 ♂ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

112. ANTHIDIUM ZEBRATUM.

Anthidium zebratum, CRESS., Trans. Am. Ent. Soc., iv, 270.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

113. NOMADA GRANDIS, *sp. nov.*

♀.—Head ferruginous, densely punctured; face clothed with yellowish pubescence; apical half of mandibles black; posterior orbits more or less yellowish; the ocelli are sometimes surrounded by a blackish stain; antennæ ferruginous, paler beneath and at extreme tip above. Thorax ferruginous, very densely and confluently punctured; collar yellow; mesothorax with a deeply impressed longitudinal line in front and a black central stripe; tubercles sometimes yellow, deeply notched anteriorly with blackish; scutellum subbilobate, entirely yellow, with a transverse line behind it; metathorax densely clothed with yellowish pubescence, black at base and down the middle, yellowish on the sides; tegulæ ferruginous. Wings subhyaline, the apical margins broadly and costal half of marginal cell fuliginous; nervures at base of wing, costal nervure and stigma ferruginous. Legs ferruginous, clothed with short, golden pubescence; coxæ pubescent, base of middle pair black. Abdomen broad, ovate, very finely and densely punctured, shining, bright yellow; basal half of first segment, as well as

the narrow apical margin of all the segments, ferruginous; apex densely clothed with fuscous pubescence, having a silvery reflection in certain lights; venter ferruginous, more or less varied with yellowish Length, 6–7 lines.

3 ♀ specimens; Colorado; Dr. H. C. Yarrow.

114. CŒLIOXYS DUBITATA.

Cœlioxys dubitata, SMITH, Brit. Mus. Cat. Hym., ii, 272.

1 ♀ specimen; New Mexico; W. G. Shedd.

115. MELECTA THORACICA, *sp. nov.*

PLATE XXXIII, FIG. 5.

♀.—Deep black; occiput, thorax above, and first abdominal segment above, clothed with a dense ochraceous pubescence; wings fuscous. Length, $6\frac{1}{4}$ lines.

1 specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

116. EPEOLUS REMIGATUS.

Melecta remigata, FABR., Syst. Piez., 387.

7 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

117. MELISSODES OBLIQUA.

Macrocera obliqua, SAY, Bost. Jour. Nat. Hist., i, 403.

14 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, Wm. H. Hance.

118. MELISSODES COMANCHE.

Melissodes Comanche, CRESS., Trans. Am. Ent. Soc., iv, 276.

2 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow.

119. MELISSODES NEVADENSIS, *sp. nov.*

PLATE XXXIV, FIG. 6.

♂.—Black; densely clothed with a long ochraceous pubescence; clypeus, labrum, and spot on base of mandibles white; mandibles with pale-fulvous stripe to tips; antennæ reaching beyond metathorax, black; scape densely pubescent; the pubescence on legs more yellowish, shading into

brown on the tarsi; abdomen clothed with short, black pubescence, that on first segment entirely ochraceous; a band on base of second segment, another near apex, and also near apex of third and fourth segments, of short, dense, pale, ochraceous pubescence; sometimes there are indications of a band near apex of fifth segment; venter fringed with pale pubescence. Length, $6\frac{1}{2}$–8 lines. (Trans. Am. Ent. Soc., 1875.)

20 specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

120. MELISSODES MENUACHUS.

Melissodes menuachus, CRESS., Trans. Am. Ent. Soc., i, 388.

10 ♂ ♀ specimens; Arizona; 1873; H. W. Henshaw: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, W. G. Shedd.

121. MELISSODES DENSA.

Melissodes densa, CRESS., Trans. Am. Ent. Soc., iv, 282.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

122. ANTHOPHORA OCCIDENTALIS.

Anthophora occidentalis, CRESS., Trans. Am. Ent. Soc., ii, 292.

5 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow.

123. ANTHOPHORA BOMBOIDES.

Anthophora bomboides, KIRBY, Faun. Bor.-Am., iv, 271.

2 ♂ ♀ specimens; Colorado; C. E. Aiken.

124. ANTHOPHORA SMITHII.

Anthophora Smithii, CRESS., Trans. Am. Ent. Soc., ii, 289.

4 ♂ specimens; Colorado; 1873; H. W. Henshaw: New Mexico; Dr. H. C. Yarrow.

125. ANTHOPHORA CALIFORNICA.

Anthophora californica, CRESS., Trans. Am. Ent. Soc., ii, 290.

1 ♀ specimen; Colorado; 1873; Dr. J. T. Rothrock.

126. XYLOCOPA CALIFORNICA.

Xylocopa californica, CRESS., Proc. Ent. Soc. Phila., 1864, 40.

3 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

127. XYLOCOPA PURPUREA.

Xylocopa purpurea, CRESS., Trans. Am. Ent. Soc., iv, 284.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

128. BOMBUS PENNSYLVANICUS.

Apis pennsylvanica, DE GEER, Ins., iii, 575.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

129. BOMBUS CALIFORNICUS.

Bombus californicus, SMITH, Brit. Mus. Cat., ii, 400.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

130. BOMBUS NEVADENSIS, *sp. nov.*

PLATE XXXIV, FIG. 5.

♀.—Black; thorax above, and three basal segments of abdomen above, clothed with a dense, yellowish pubescence; wings black or dark fuliginous; legs clothed with black pubescence. Length, 9 lines.

♂.—Like the ♀, except that the pubescence of the face and head above is yellowish; the face narrower, and the eyes much larger, antennæ longer, &c. Length, 8 lines. (Trans. Am. Ent. Soc., 1875.)

5 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; 1873; H. W. Henshaw: New Mexico; Dr. H. C. Yarrow.

131. BOMBUS FERVIDUS.

Bombus fervidus, FABR., Syst. Piez., 352.

1 ♂ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

132. BOMBUS TERNARIUS.

Bombus ternarius, SAY, Bost. Jour. Nat. Hist., i, 414.

2 ♂ specimens; Colorado; 1873; Dr. J. T. Rothrock: New Mexico; Dr. Oscar Loew.

133. APATHUS INSULARIS.

Apathus insularis, SMITH, Jour. Ent., i, 155.

2 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Colorado; 1873; Dr. J. T. Rothrock.

Report upon the collections of Formicidæ, made during the years 1872, 1873, *and* 1874, *by*

EDWARD NORTON.

To make sure of the correct determination of this series of Ants, I forwarded a set of them to Dr. G. Mayr, Vienna, who kindly compared them with his large collection, and fixed them with greater precision than is possible in this country.

It is a matter of surprise to find so many species along certain parallels of latitude, apparently identical in this country and in Europe, and in some cases around the whole world.

So many new species have been found in Mexico that this result was hardly to be expected in New Mexico and Colorado.

I have before learned that great caution will be required in making up a list of the Formicidæ of the Northern United States.

Fam. FORMICIDAE.

1. Subfamily FORMICIDAE.

CAMPONOTUS, Mayr.

Camponotus, Mayr, Eur. Formiciden, 1861, 35.

1. CAMPONOTUS MARGINATUS, Latr.

Formica marginata, Latr., Hist. N. Formic., 103, ♀ *nec* ☿.—Mayr., Form. Austr., 42. ♂.—Smith, Brit. Mus. Cat., 11.
Formica fallax, Nyl., Ann. Sc. N. Fr., iv, ser. v, 57, ☿.
Camponotus fallax, Mayr, Eur. Form., 36.

Common in Southern and Middle Europe and North and South America.

No.	Locality.	Date.	Collector.
153 E	Plaza del Alcalde, N. Mex.	1874	Dr. H. C. Yarrow.

2. CAMPONOTUS PENSYLVANICUS, De Geer.

Formica pensylvanica, De Geer, Hist. Ins., i, 289; iii, 603, pl. 31, 9, 10, ☿, ♀, ♂.
Formica pubescens, var., Latr., Hist. Formic., 99.
Camponotus pensylvanicus, Mayr, Myr. Stud., 666.
Formica semipunctata, Kirby, Zoöl. Brit. N. Am., T. 262.

Common in North America.

No.	Locality.	Date.	Collector.
L 43	"New Mexico"	——, 1874	Dr. O. Loew.
B 197	San Luis Valley, Colo	——, 1872	Dr. J. T. Rothrock.

3. CAMPONOTUS PUBESCENS, Fabr., var.

Camponotus pubescens, Mayr, Eur. Form., 36.
Formica pubescens, Fabr, Syst., Ent., 1775, 392; Ent. Syst., ii, 352.
Formica fuscoptera, Ol., Encyc. Méth., vi, 491.
Formica vaga, Schrank, Ins. Aust., No. 835.—Scop., Ins. Carn., 313.
Formica pensylvanica, Asa Fitch, Rept., i, 152.
Formica caryæ, Asa Fitch, Rep., i, 151.

Europe, Asia, Algeria, Madeira, and North America.

No.	Locality.	Date.	Collector.
L 97	New Mexico	Sept. 1, 1874	Dr. O. Loew.
105 C	Taos, N. Mex	Aug. 17, 1874	Dr. H. C. Yarrow.
1425	Cave Spring, Ariz	Aug., 1874	Henry Johnson.

4. CAMPONOTUS SYLVATICUS, Ol.

Camponotus sylvaticus, Rog., Berl. Ent. Z., 1862, 291.
Formica sylvatica, Ol., Encyc. Méth., vi, 491.
Formica pallens, Nyl., Add. alt., 36.
Formica marginata, Ltr., Hist. Form., 103, ☿, not ♀
Formica castaneipes, Leach, Zoöl. Jour., ii, 289.
Camponotus marginatus, Mayr, Eur. Form., 36.

Southern Europe, Northern Africa, and Madeira.

No.	Locality.	Date.	Collector.
284 E	Pagosa, Colo	Sept. 1, 1874	C. E. Aiken.

5. CAMPONOTUS VICINUS?, Mayr.

Camponotus vicinus, MAYR, Neue Formic., 1870, 940.

Connecticut, Virginia, New Mexico, and California.

No.	Locality.	Date.	Collector.
247 C	New Mexico	Sept. 18, 1874	Dr. H. C. Yarrow.

Worker very like *C. ligniperda* and *C. herculanea*. Differs only in having the mandible 5–6 dentate and clypeus distinctly carinate and moderately protracted before.

LASIUS, Fabr.

Lasius, FABR., Syst. Piez., 1804, 415.

1. LASIUS ALIENUS, Foerst.

Formica aliena, FOERST., Hym. Stud., i, 1850, 41, ☿, ♀, ♂.
Lasius alienus, MAYR, Eur. Form., 50.

Southern and Middle Europe.

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex.	——, 1874	Dr. O. Loew.

2. LASIUS CLAVIGER, Rog.

Formica clavigera, ROG., Berl. Ent. Z., 1862, 241, ♀, Penn.
Acanthomyops claviger, MAYR, Myr. Stud., 1862.
Lasius claviger, MAYR, Neue Form., 1870, 950, ☿, ♂, Ct., N. Y.

Connecticut, New York, and Pennsylvania.

No.	Locality.	Date.	Collector.
271 B	Pagosa, Colo	——, 1874	Dr. H. C. Yarrow.

3. LASIUS NIGER, Linné.

Formica nigra, LINNÉ, Faun. Suec., 1723.
Lasius niger, FABR., Syst. Piez., 415.
Formica fusca, FÖRST., Hymen. Stud., i, 33, ☿, ♀, ♂.
Formica pallescens, SCHENK, Jahrb. Beschr. Nass., 1852, 55, ☿, ♀, ♂.

All of Europe, Madeira, and North America.

No.	Locality.	Date.	Collector.
B 197	San Luis Valley, Colo	Sept., 1872	Dr. J. T. Rothrock.

FORMICA, Linné.

Formica, LINNÉ, Faun. Suec., 1761, 426.

1. FORMICA CINEREA, Mayr.

Formica cinerea, MAYR, Verh. z.-b. V., 1853, 281, ☿, ♀, ♂.— —, Neue Form., 1870, 951.

South and Middle Europe and California.

No.	Locality.	Date.	Collector.
L 37	New Mexico	——, 1874	Dr. O. Loew.

2. FORMICA FUSCA, Linné.

Formica fusca, LINNÉ, Faun. Suec., 1722, 226.—MAYR, Neue Form., 1870, 951
Formica glebaria, NYL., Act. Soc. Sc. Form., ii, F. iii, 917.
Formica flavipes, GEOFF., Encyc. Méth., vi, 493.

Europe, Africa, Madeira, Newfoundland, North America, and California.

No.	Locality.	Date.	Collector.
L 37	New Mexico	——, 1874	Dr. O. Loew.
137 E	Taos, N. Mex	Aug., 1874	W. G. Shedd.
234	Tierra Amarilla, N. Mex	Sept., 1874	Do.
1604	San Ildefonso	Aug., 1874	Dr. H. C. Yarrow.

3. FORMICA GAGATES, Latr., *var.*

Formica gagates, LATR., Hist. N. Formic., 1802, 138, pl. 5, 26, ☿, ♀.—MAYR, Neue Form., 1870, 951.
Formica picea, NYL., Act. Soc. Sc. Fenn., 917.

All of Europe, Northern Africa, Connecticut, and California.

No.	Locality.	Date.	Collector.
53 E	Fort Garland, Colo	July, 1874	Dr. H. C. Yarrow.

4. FORMICA INTEGRA, Nyl.

Formica integra, NYL., Ann. Sc. Nat., F. iv, ser. v, ☿.—MAYR, Neue Form., 951.

Connecticut and New York.

No.	Locality.	Date.	Collector.
271 B	Pagosa, Colo	Sept. 18, 1874	Dr. H. C. Yarrow.
A 184 C	Roaring Fork, Colo	Aug. —, 1872	Dr. J. T. Rothrock.

5. FORMICA RUFIBARBIS, F., ☿.

Formica rufibarbis, FABR., Ent. Syst., ii, 1792, 355, ☿.
Formica cunicularia, LATR., Hist. N. Fourm., 1798, 151.—MAYR, Neue Form., 1870, 951.
Formica obsoleta, LATR., Ess. Hist. Fourm. Fr. 38.
Formica pratensis, OL., Encyc. Méth., vi, 504.
Formica nicæensis, LEACH, Vigor's Zoöl. Jour., 1825, ii, 289!
Formica stenoptera, FÖRST., Hym. Stud., i, 26, ☿, ☿.

Europe, Northern Asia, and Connecticut (Mayr).

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex	—, 1874	Dr. O. Loew.
160 B	San Ildefonso, N. Mex	—, 1874	Dr. H. C Yarrow.

6. FORMICA SCHAUFUSSI, Mayr.

Formica schaufussi, MAYR, Myrm. Beitr., 1866.—MAYR, Neue Form., 1870 951.

New Jersey.

No.	Locality.	Date.	Collector.
L 37	New Mexico	—, 1874	Dr. H. C. Yarrow.

7. FORMICA TRUNCICOLA, Nyl., var. OBSCURIVENTRIS, Mayr.

Formica truncicola, NYL., Adn. Mon. Form., 907.
Formica truncorum, FABR., Syst. Piez., 403, ☿.

North and Middle Europe, Piedmont, and Spain.

Var. *obscuriventris*, MAYR, Neue Formic., 1870, 951.

Connecticut.

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex	—, 1874	Dr. O. Loew.
165 A	Pueblo, Colo	—, 1874	C. E. Aiken.
374 A	Fort Garland, Colo	—, 1874	F. Klett.
L 1	New Mexico	—, 1874	Dr. O. Loew.
197 K	San Luis, Colo	—, 1872	Dr. J. T. Rothrock.

This may be considered the American variety of *F. truncicola.*

CATAGLYPHIS, Först.

Cataglyphis, FÖRST., Verh. Naturh. v. Rheinl., vii, 1850, 485.
Monocombus, MAYR, Form. Austr., 1861, 109.
Myrmecocystus, WESM., Bull. Acad. Rog. Brux., 1838, 764.

1. CATAGLYPHIS MELLIGERA, Llave.

Cataglyphis melligera, LLAVE, Rog. Berl. Ent. Z., 1862, 254.—MAYR, Myrm. Stud., 701, 1862.
Formica melligera, LLAVE, Reg. Mem. Hist., 1832.
Myrmecocystus mexicanus, WESM., Bull. Ac. R. Brux., 1838, 766, ☿.
Myrmecocystus melligerus, LUC., Rev. Mag. Zoöl., 1860, 269.

Mexico and Texas.

No.	Locality.	Date.	Collector.
X Y	Santa Fé, N. Mex	—, 1872	T. Collins.
L 37	New Mexico	—, 1874	Dr. O. Loew.

This is the famous honey producing ant of Mexico.

5. Subfamily MYRMICIDAE.

DORYMYRMEX, Mayr.

Dorymyrmex, MAYR, Formic. Nov. Amer., 1868, 7.

1. DORYMYRMEX PYRAMICUS, Rog.

Prenolepis pyramica, ROG., Ber. Ent. Zeit., 1863, sp. 42, ☿, 160.

Brazil, Bahia, and Corrientes.

No.	Locality.	Date.	Collector.
153 E	Plaza del Alcade, N. Mex	Aug., 1874	Dr. H. C. Yarrow.

POGONOMYRMEX, Mayr.

Pogonomyrmex, MAYR, Formic. Nov. Amer., 1868, 11.

1. POGONOMYRMEX BARBATUS, Smith.

Myrmica barbata, SMITH, Brit. Mus. Cat., 125.
Pogonomyrmex barbatus, MAYR, Neue Formic., 1870, 971, ☿.

Mexico and Texas.

No.	Locality.	Date.	Collector.
1299	Southern Arizona	—, 1874	H. W. Henshaw.
L 1	New Mexico	—, 1874	Dr. O. Loew.
L 67	Santa Fé, N. Mex	—, 1874	Dr. O Loew.
L 68	Santa Fé, N. Mex	—, 1874	Dr. O. Loew.
318	Bowie Agency, Ariz	—, 1874	Henry Johnson.

2. POGONOMYRMEX OPACICEPS, Mayr.

Pogonomyrmex opaciceps, MAYR, Neue Formic., 1870, 971, ☿.

New Mexico.

No.	Locality.	Date.	Collector.
A 197 B	San Luis Valley, Colo	Sept., 1872	Dr. J. T. Rothrock.
14 K	Colorado	—, 1872	Do.
L 97	New Mexico	—, 1874	Dr. O. Loew.
104 E	San Ildefonso, N. Mex	—, 1874	Dr. H. C. Yarrow.
160 B	San Ildefonso, N. Mex	—, 1874	Do.

3. POGONOMYRMEX ——!, *sp. nov.*

No.	Locality.	Date.	Collector.
L 9	New Mexico	—, 1874	W. D. Wheeler.

4. POGONOMYRMEX ——!, *sp. nov.*

No.	Locality.	Date.	Collector.
247 C	New Mexico	—, 1874	Dr. H. C. Yarrow.

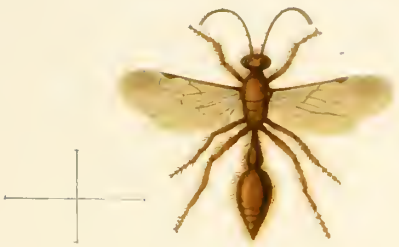
APHAENOGASTER, Mayr.

Aphænogaster, MAYR, Verh. z.-b. V., 1853, 107, 87, REISE, Freg. Novara., 1865, 19.

1. APHAENOGASTER ——!, *sp. nov.*

No.	Locality.	Date.	Collector.
1015 C	Camp Hall.....	Oct. 17, 1874	Jas. M. Rutter.

1



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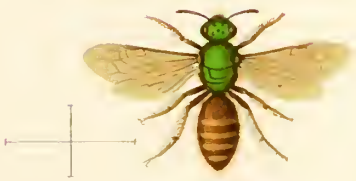

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FIG. 1. STIZUS NEVADENSIS. ♂ FIG. 2. AGAMA ATRIPES. ♂
FIG. 3 HALICTUS TRIZONATUS. ♀ FIG. 4. AGAPOSTEMON MELLIVENTRIS.
FIG. 5. MELECTA THORACICA. ♀

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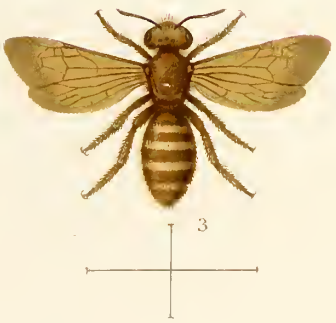

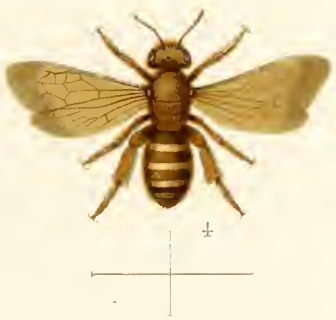

FIG.1 VESPA OCCIDENTALIS.♀ FIG 2 VESPA OCCIDENTALIS.♂
FIG.3 NOMIA NEVADENSIS.♀ FIG 4 NOMIA NEVADENSIS.♂
FIG.5 BOMBUS NEVADENSIS.♀ FIG 6 MELISSODES NEVADENSIS.♂

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CHAPTER VIII.

REPORT

UPON

THE COLLECTIONS OF DIURNAL LEPIDOPTERA

MADE IN PORTIONS OF

COLORADO, UTAH, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874,

WITH NOTES UPON ALL SPECIES KNOWN TO INHABIT COLORADO.

BY

THEODORE L. MEAD;

AND A LIST OF ALL SPECIES COLLECTED,

BY

W. H. EDWARDS.

47 z

CHAPTER VIII.

The following notes upon the distribution of these butterflies have been largely made out from data furnished by Dr. H. C. Yarrow, of the expedition. The observations upon the Colorado species were made by me during the summer of 1871.

My thanks are due to Henry Edwards, esq., of San Francisco, for notes upon some species whose habits were unknown to me. These will be found under the headings of the respective species.

All the *Diurnal Lepidoptera* taken by the expedition were confided to W. H. Edwards, esq., of Coalburgh, W. Va., for determination; and his original descriptions of the new species discovered by the expedition have been introduced in their appropriate places in this report. Descriptions by the same author of one or two other species have been reprinted here where there were special reasons for it; but it was not thought necessary to give descriptions of all, since much the larger number are contained in the proceedings of two or three societies, which are readily accessible to most entomologists who would be likely to possess Rocky Mountain butterflies.

In regard to the synonymy, only those names have been given concerning which any doubt is likely to arise, since synonyms which have been entirely disused for half a century or more would uselessly encumber the pages of any work, except a mere synonymic list, the more so as the entomological world now displays such activity in the production of books of this latter class.

The reference immediately following the name of the species is to the best description or figure readily accessible to American students.

One hundred and twenty-one species are now known to inhabit Colorado; in 1867, but seventy-two were recorded as from the Rocky Mountains.

For convenience of reference, a sign (†) is prefixed to species not known to be found in Colorado.

PAPILIO, (Linn.) Latr.

PAPILIO ZOLICAON, Boisd.

Papilio Zolicaon, STRECKER, "Lepidoptera," pl. 6.—MORRIS, Syn. Am. Lep., 4.

In Colorado, *Zolicaon* appears two or three weeks later than the other Papilios. It inhabits all the mountainous parts of the Territory, was brought by the expedition from Southern Utah, and occurs westward to the Pacific Ocean.

This species may be at once separated from *P. Machaon*, or its variety, *Aliaska*, by the pupillated ocellus at the anal angle of secondaries.

PAPILIO ASTERIAS, Drury.

Papilio Asterias, HARRIS, Insects Injurious to Vegetation.
Papilio Polyxenes (obsolete), KIRBY, Cat. Di. Lep., 1871.
A. Polyxenes, SCUD., Syn. List., 1875.

This butterfly occurs rarely in Colorado, New Mexico, and California; eastward becoming more abundant. I have not found the species at elevations greater than 7,500 feet. Its time of flight is June and July.

†PAPILIO BAIRDII, Edw.

Papilio Bairdii, EDW., Proc. Ent. Soc. Phila., 1866.

Allied to *Asterias;* primaries more produced and narrower, and secondaries more rounded than in that species.

Male.—Expands four inches; upper side black; both wings crossed by yellow bands as in *Asterias*, the spots being similarly shaped, but larger than in that species, and fading gradually into the black ground on the inner side; at the anal angle a rounder black spot within a spot that is fulvous above, yellow below. There is no trace of blue between the yellow bands on secondaries, as there is in *Asterias.*

Under side black; marked as above, the yellow paler; the end of the cell on primaries a little yellow; the outer ends only of the spots beyond the cell on secondaries very slightly fulvous; each of the black spaces between the yellow bands on secondaries a little sprinkled with blue scales.

Body black; shoulders brown-yellow; two dorsal and a lateral row of yellow spots on the abdomen.—*Edwards, l. c.*

This species belongs to the group of Papilios, of which *Machaon* is the type, and is one of a number of forms closely related to *Asterias*, and probably derived from that species. All of these are characterized by the spotted abdomen; that of *Machaon* is banded. The larvæ of the whole group feed on umbelliferous plants. *P. Bairdii* is still excessively rare in collections. A single specimen, the original type, was brought from Arizona in 1865, and the expedition took specimens in New Mexico in 1871, and in Arizona in 1873.

† PAPILIO PILUMNUS, Boisd.

Papilio Pilumnus, STRECKER, Illustrations of Lepidoptera, 1873.

This species was taken by the expedition in 1871. It occurs in New Mexico and southward.

PAPILIO TURNUS, Linn.

This common eastern species has occasionally been found in the Rocky Mountains, which seem to be the limit of its westward range.

PAPILIO RUTULUS, Boisd.

Papilio Rutulus, EDW., Butterflies N. A., ii.—REAKIRT, Proc. Ent. Soc. Phila., 1866.

This species is very closely allied to *P. Turnus*. The only constant distinction seems to be that in *Rutulus* the submarginal ray on the under side of secondaries is continuous; in *Turnus* it is broken up into distinct spots. No melanized females of this species are known. All the specimens have rather elongated hind wings, as is the case with New England specimens of *Turnus*. The female is not so heavily marked with blue on the secondaries as in the latter species, but occasional specimens from the Eastern States approach very closely in marking to the normal female of *Rutulus*.

Rutulus was brought by the expedition from Southern Utah; is taken in Colorado in the month of June, there frequenting open woods and hillsides where flowers are abundant. It is common in California. In Colorado, there is no second brood of Papilio.

PAPILIO DAUNUS, Bois.

Papilio Daunus, EDW., Butterflies N. A., ii.—RIDINGS, Proc. Ent. Soc. Phila., 1862.—STRECKER, "Lepidoptera."

This species may be at once distinguished from others nearly allied by

the narrow black markings, strongly arched primaries, and the three long tails of the secondaries.

Though apparently a mountain species in Colorado, it rarely occurs far above 7,500 feet elevation. It is an exceedingly rapid flier. The species has not been recorded from any locality north of Colorado. It was taken by the expedition in Southern Utah, and is known to range southward into Mexico. The Mexican specimens are more brightly colored, and are much larger than those found farther north. In Colorado, the species does not usually exceed four inches in expanse; those from Mexico sometimes measure five and one-half inches.

In Colorado, the species should be looked for during the month of June.

PAPILIO EURYMEDON, Boisd.

This species I have taken in the mountains of Colorado at 7,500 feet elevation; the species resembles *Rutulus*, but is easily distinguished by its pale ground color. On the Pacific slope, it occurs as far north as Washington Territory.

PARNASSIUS, Latr.

PARNASSIUS SMINTHEUS, Doubleday.

Parnassius Smintheus, EDW., Butterflies N. A., i.
Parnassius Delius, var., auct.
Parnassius Phœbus, var., KIRBY, Cat.

Parnassius Smintheus was brought by the expedition from Gray's Peaks, Colorado, and from the mountains of Southern Utah. It is found throughout the Rocky Mountain region, and a single specimen has been taken near the Yosemite Valley, California, where, however, *Clodius*, as a rule, takes its place. In Colorado, the species is abundant from the first foothills to the highest peaks. At moderate elevations, the first specimens come from chrysalis in May, and are seen flying or sucking the nectar from flowers of a common species of *Sedum* before their wings have thoroughly stiffened. Two or three weeks later, the females begin to appear; they are more heavily dusted with gray than the males, and at the highest elevations are often very dark, almost black, and smaller. Probably this darker color, harmonizing with the rocks and lichens, serves as a protection to the females, which is less needed by individuals inhabiting lower and more fertile local-

ities, where they can better conceal themselves in the herbage for the night, and where the general color given by the vegetation is more brown than black.

At the higher elevations the species appears later in the season, and at 12,000 feet may be found until the last of August.

The eggs are laid on *Sedum;* in shape they are flattened spheres, above with a small conical depression, in the center of which is the micropyle. The egg is chalky-white, and to the naked eye seems covered with little granulations, except a smooth round spot below, which is the surface of attachment to the plant.

The eggs do not hatch until the following spring, when a hole is eaten through the side of the egg by the larvæ. At first these are black, with a few bristling hairs. The adult caterpillar is not known, but probably resembles that of allied European species in being smooth and nearly black, with orange dots.

† PARNASSIUS CLODIUS, Ménétriés.

Parnassius Clodius, EDW., Butterflies N. A., i.

This species was brought by the expedition from Southern Utah; specimens have been taken in Montana, but the proper home of the species seems to be nearer the Pacific coast. It has not been found in Colorado.

NEOPHASIA, Behr.

NEOPHASIA MENAPIA, Felder.

Neophasia Menapia, EDW., Butterflies N. A., i.

This western species was taken in some numbers in Colorado by the Allen expedition of 1871. They were found early in August, but the precise locality I do not know. Colorado specimens have the outer half of costal margin of secondaries tinged with vermilion *in the male.* This, I believe, is not shown by Californian examples.

The larva is unknown. I copy the following description of the chrysalis of *N. Menapia*, from a very interesting paper by Henry Edwards, esq., on the Early Stages of Pacific Coast Lepidoptera, published in the Proceedings of the California Academy of Science for 1873:—

"*Chrysalis.*—Very long and tubular, with the beak sharply pointed;

slightly thickened toward base of abdomen. A small ridge-like protuberance on the thorax, and a smaller one near the head. Color immediately after change pale yellowish-green, with three narrow dorsal stripes silvery white. The lateral stripes inclosing the stigmata are a little broader, and bent upward anteriorly. Stigmata brownish. The neuration of the wings is plainly seen, and at their base is a well defined black spot. Toward the period of emergence, the chrysalis loses its bright-green color, and becomes of a dark-olive hue, almost black above; the silvery tone of the stripes changing to dirty white, the coloration of the wings and various organs being more distinctly seen. The chrysalis is attached to the trunks of pine and fir trees, with the head invariably directed upward, and to the fronds of *Pteris*, with the head always toward the point of the frond.

"Length, 0.80 inch; width, 0.15 inch.

"I was fortunate enough to discover the chrysalis of this highly interesting species during a recent trip to Vancouver Island, but the most diligent search did not reward me with the caterpillar. It doubtless feeds upon the Douglas spruce fir (*Abies Douglasii*), and should be sought for in the early part of July."

PIERIS, Schrank.

PIERIS OLERACEA, Boisd.

Pieris Oleracea, HARRIS, Insects Injurious to Vegetation, 1862.

P. Oleracea I met with first near Fairplay (elevation 10,000 feet), June 12, where they were not uncommon at the edges of the woods. The specimens were fresh from chrysalis, and nearly pure white below. Later in June they were seen in most places where collections were made, though not in very great numbers; the species disappeared entirely by the last of July, and there is no second brood.

PIERIS PROTODICE, Boisd.

Pieris Protodice, RILEY, Am. Ent., ii, 77.

This species occurs everywhere in Colorado below timber line, and remains nearly all summer. Specimens were brought by the expedition from Arizona, and it is known to occur in California.

PIERIS VERNALIS, Edw.

Pieris Vernalis, EDW., Butterflies N. A., i.

P. Vernalis has been found in company with *Protodice* and *Occidentalis* in the mountains of Colorado; it is widely distributed, and as yet little is known of its habits. Usually it is only seen in early spring; but my friend, Mr. G. M. Dodge, late in autumn captured a single male near Princeton, Ill.

PIERIS OCCIDENTALIS, Reakirt.

Pieris Occcidentalis, REAKIRT, Proc. Ent. Soc. Phila., 1866.
Pieris Callidice, var., STAUDINGER *in litt.*

This species was brought by the expedition from Southern Utah; its range commences near the Rocky Mountains, and extends to the Pacific Ocean. In Colorado, it is found on the plains as well as at considerable elevations, and remains from May till August.

†PIERIS BECKERII, Edw.

Pieris Beckerii, EDW., Butterflies N. A., i.
Pieris Chloridice, var., ZELLER.

Primaries produced apically; slightly excavated on costal and hind margins.

Male.—Expands two inches. Upper side pure white; the texture of the secondaries slighter than that of the primaries, discovering the spots of under surface; base of wings not powdered with black, as in allied species; primaries have the apical half of hind margin bordered by small black patches or clusters of scales, diminishing in size to middle of margin; anterior to these, two similar subapical patches, and a third in upper median interspace; on the arc a dense subrectangular spot (not reaching the costa) with a central white streak; secondaries immaculate. Fringes white, except against the apical spots; there black.

Under side white; the nervules at apex and on upper hind margin bordered by black scales and suffused with greenish-yellow; the spot on interspace black as on upper side; cellular spot enlarged, its base broadened and the posterior edge excavated.

Secondaries have all the nervures and their branches yellow; those

terminating on hind margin edged by broad bands of yellow-green, reaching to the middle of disk, and connected anteriorly; three large spots of same color about the cell, two being at the outer angles, and one above and reaching the costa; another large triangular subapical spot on costa; the nervures at base also banded with green; all these bands and spots slightly sprinkled with black scales.

Body above covered with gray hairs; beneath, abdomen yellowish; thorax white; legs white; palpi white, gray on upper side and at tip; antennæ white above and at base below, beyond brown; club black, nearly covered with rows of white scales; tip pale fulvous.

Female.—Expands two inches. Primaries less produced and broader than in male; same shade of color; the marginal spots enlarged and extended to second branch of median; in addition to the three submarginal spots, which are also enlarged, is another in submedian interspace, and a streak below this along inner margin; the cellular spot much enlarged, rhomboidal, with slight central streak; secondaries have a patch on costa, and four on the marginal nervules commencing at and posterior to subcostal; also an interrupted submarginal stripe opposite cell, posteriorly indistinct; under side as in male, except that a round black spot appears in submedian interspace on primaries.—*Edwards, l. c.*

This species has recently been asserted to be identical with *Chloridice* of Europe; but this seems to me extremely doubtful, since the same thing has been lately maintained regarding *P. Occidentalis* and *Callidice*, and even *Grapta Faunus*, *Satyrus*, and *Comma* have been called varieties of *C. Album;* all these species being abundantly distinct.

P. Beckerii was found by the expedition in Southern Utah. Regarding its habits, Mr. Henry Edwards, its discoverer, writes as follows:

"This beautiful species, characterized by Mr. W. H. Edwards as the finest of the North American *Pierides*, appears to be extremely limited in its range; the only locality at present known by me being the neighborhood of Virginia City, Nev. It is an early insect, being seen on the wing, if the weather be favorable, somewhere about the 10th of April, disappearing toward the close of May. It is a rapid flier, and is taken with great difficulty. The best time for its capture is in the early morning, when it

alights frequently on the flowers of the wild mustard and other cruciferous plants; but as soon as the sun is well up, it darts away on prolonged flights, and is rarely seen by the collector.

"I observed it once in the vicinity of Washoe Lake, Nevada, in some numbers, but the day was warm, and the insects extremely wild. Nothing is known at present of the earlier stages."

NATHALIS, Boisd.

NATHALIS IOLE, Boisd.

Nathalis Irene, FITCH, 3d N. Y. Rep.

N. Iole is found throughout the Southwestern States and in Colorado. Specimens were also brought by the expedition from Utah, the most western point from which the species has been recorded. In Colorado, at 7,500 feet elevation, the species was met with about the 20th of June; and a few days later one or two were seen in the South Park. It is not uncommon in the mountains, like several other species which at the East are rarely found north of the cotton States, although, even in New England, they would hardly be subjected to as great or such continued extremes of cold as in these parts of Colorado. *D. Berenice* and *E. Claudia* are similar examples. A partial explanation might be found in the supposition that some bird which preys upon them or their larvæ at the East may be absent in the Rocky Mountains, though, as all birds reject the *Danaidæ*, this will not explain the occurrence of *Berenice*.

ANTHOCHARIS, Boisd.

ANTHOCHARIS AUSONIDES, Boisd.

Anthocaris Ausonides, EDW., Proc. Ent. Soc. Phila., 1863.
Anthocaris Ausonoides, auct. Amer.

Taken by the expedition in Colorado, where, in June, it is quite abundant throughout the mountain district, and may then be seen depositing its eggs upon wild *Cruciferæ*. The larva is yellow, striped longitudinally with lead color, and dotted with black granulations; it attains its growth early in July, and changes to a curiously horned chrysalis, pale brownish in color, with a darker lateral line. The chrysalis tapers gradu-

ally and almost equally toward either extremity, and at first glance much resembles a curled and withered leaf.

The pupa state is assumed early in July; the perfect insect escapes the following season.

A. Ausonides is also found in California, where the specimens are usually larger and the females often have the secondaries suffused with a pale-yellow or creamy tint, rarely seen in Rocky Mountain specimens.

ANTHOCHARIS CREUSA, Doubleday.

A. Creusa from Colorado very closely resembles the preceding species; the difference mainly consisting in the greater amount and darker shade of the green on the lower surface of secondaries. *Creusa* seems to be confined to the Rocky Mountains.

ANTHOCHARIS JULIA, Edw.

Anthocaris Julia, EDW., Proc. Am. Ent. Soc., 1872.

This species has only been taken near Fairplay, South Park, Colo., where I found a number of specimens, June 12 to 14, in the woods and on the banks of Beaver Creek. It is the Rocky Mountain representative of the two Californian species *Sara* and *Reakirtii*.

COLIAS, (Fabr.) Leach.

COLIAS EURYTHEME, Boisd., and COLIAS KEEWAYDIN, Edw.

Colias Eurytheme and *Colias Keewaydin*, EDW., Butterflies N. A., i.

Both species were taken by the expedition. They range from the Mississippi Valley to the Pacific Ocean, and from the level of the sea to upward of ten thousand feet elevation. They are abundant from early spring until frost. Above eleven thousand feet, they are rarely found in Colorado; in fact, the usual American types are there almost entirely replaced by Arctic species, a considerable proportion of which are common to both hemispheres.

COLIAS PHILODICE, Godart.

This is not so abundant in Colorado as either of the preceding species. Most of the specimens were taken in June. Some of them exactly resemble eastern specimens; others are paler, and have a somewhat greenish tint on both surfaces.

COLIAS ALEXANDRA, Edw.

Colias Alexandra, EDW., Butterflies N. A., i.

This species was brought from the South Park, Colorado, by the expedition in 1873. The species appears about the middle of June, and for a time is abundant on all the headwaters of the Platte. Occasionally it may be taken on the Upper Arkansas, though there it is largely replaced by *C. Scudderii.*

The eggs are deposited on wild lupines, and the young larva closely resembles that of *Philodice.* By the last of August, the species has quite disappeared. There is but one brood in the season.

†COLIAS EDWARDSII, Behr.

Colias Edwardsii, EDW., Butterflies N. A., i.

Specimens were taken by the expedition at Owen's Lake, California. Concerning the species, Mr. Henry Edwards writes as follows:

"How far this may be found in a long series to differ from *C. Alexandra*, I am unable to determine at present. It may probably prove to be an extreme variety. It is only known to me from Virginia City, Nev., where it frequents the sides of mountains, flying with great rapidity, and evidently delighting in long and restless flights. It makes its first appearance about the beginning of April, and continues on the wing to the end of June. It is decidedly a rare insect."

COLIAS SCUDDERII, Reakirt.

Colias Scudderii, EDW., Butterflies N. A., i.

C. Scudderii was found by the expedition at Twin Lakes, Colorado, where it is not uncommon in July, appearing a little later than *Alexandra.* Nearly all the females of *Scudderii* are albinoes, while in *Alexandra* white females are the rare exception.

A female, *C. Scudderii*, apparently mature, was inclosed in a box with dwarf lupines, but refused to lay eggs, although *Alexandra* laid freely upon the same. This would indicate that the species have different food plants, though of course the experiment is not conclusive.

COLIAS MEADII, Edw.

Colias Meadii, EDW., Butterflies N. A., i.

C. Meadii was first met with on the Arkansas divide, between Fairplay and California Gulch, Colorado, on the 8th of July. In the same locality, two weeks later, it was especially abundant, and thirty-four specimens were taken. Others were found on Mount Lincoln and Gray's Peaks. It is a strictly alpine insect, being scarcely ever found as low as 10,000 feet above the sea, and having its proper home just at timber line, or a little above. It disappears about the middle of August. In the Arctic regions of Europe and America, a species (*C. Hecla*) is found, resembling this in color and marking, but differing structurally; and Dr. Staudinger informs me that a very similar species is met with at high elevations in the Himalayahs.

TERIAS, Swain.

†TERIAS NICIPPE, Cramer.

This, unlike many other southern forms, does not seem to range northward in the Rocky Mountains. Specimens were taken by the expedition in Arizona; and it is recorded from San Diego, Cal.

DANAIS, (Latr.) Godart.

DANAIS ARCHIPPUS, Cramer.

Danais Erippus (obsolete), KIRBY, Syn. Cat.
Danais Plexippus (obsolete), SCUD., Syn. List, 1875.

Abundant everywhere in the Rocky Mountains below timber line.

DANAIS BERENICE, Cramer.

Danais Gilippus, SMITH-ABB., KIRBY, Cat.

Taken by the expedition in Southern Utah. In Colorado, this species is rare; one specimen was seen near Georgetown. It should be looked for early in August.

EUPTOIETA, Doubleday.

EUPTOIETA CLAUDIA, Cramer.

Argynnis Columbina, MORRIS, Syn. Lept. N. A.

Brought by the expedition from Arizona and Colorado. The species may be found among the foot-hills of the Rocky Mountains in May, and

soon becomes very abundant throughout the whole region. The specimens are quite similar to those of the Southern States, though perhaps a shade paler below. During July, the eggs are laid upon a species of *Sedum;* in some localities, on almost every little clump of the plant one or several eggs of *Claudia*, with occasionally one of *P. Smintheus*, may be found.

The eggs soon hatch, but the season is so short that in all probability the larvæ hibernate when half grown. The mature larva is dark reddish-brown, with steel-blue spines; the skin is highly polished, seeming to have a glaze like that of some stone ware. The chrysalis somewhat resembles that of *Melitæa;* it is pale-gray, with some yellow dots.

ARGYNNIS, Fabr.

†ARGYNNIS NOKOMIS, Edw.

PLATE XXXV, FIGS. 1, 2, 3. 4.

Argynnis Nokomis, EDW., Butterflies N. A., i.

Specimens of this magnificent insect were brought by the expedition from Arizona in 1871. Until that time but a single male was known—from the Bitter Root Mountains of Montana.

†ARGYNNIS NITOCRIS, Edw.

Arginnis Nitocris, EDW., Trans. Am. Ent. Soc., v.

Male.—Expands three inches. Upper side bright fulvous, much obscured by brown from base to middle of disk, except upon a portion of cell of primaries; both wings edged by two parallel, fine, black lines, which, on secondaries, inclose a rather broad fulvous space, on primaries a narrower space, divided by the black nervules; anterior to these lines on primaries a series of black lanceolate spots, the three or four next apex connected and resting upon the inner line, the others separated and not touching the line. On secondaries, a series of lunular separated spots; the rounded, extradiscal spots, as in *Nokomis;* small on secondaries, rather large on primaries. The markings on disk and to base as in *Nokomis*, heavy on primaries, light on secondaries; the discal band on the latter broken into small, separate lunules. The spot on the arc like the letter S. Fringe of secondaries light-fulvous; of primaries deep-fulvous. Black at tips of nervules.

Under side of primaries cinnamon-red from base to hind margin, and over entire wing, except a small subapical space across the subcostal nervules, which is bright ochraceous-yellow, and a brown patch just anterior to this on costal margin. The black markings repeated. The five lanceolate spots next apex inclosing silver lunules. Three silver spots on the brown costal patch, one of them minute.

Secondaries deep ferruginous from base to outer edge of the second row of spots; between this and the outer row a clear space, as in *Cybele*, bright ochraceous-yellow. The seven submarginal spots narrow segments of circles, edged above with ferruginous; the second row seven, rather small; the first, second, and sixth equal, subrotund; the third and fifth long oval; the fourth minute, and seventh sublunate; all heavily edged above with black. The third row of three large spots, the first and third sublunate, the second rounded, edged above with black. In cell a round spot, and below cell an oval, both ringed with black; all these spots well silvered; a silver patch at base of cell, and another at base of subcostal. Shoulder and abdominal margin lightly silvered.

Body above fulvous; beneath fulvous, with buff and gray hairs; legs fulvous; palpi fulvous, buff at sides; antennæ fuscous above, fulvous below; club black; tip fulvous.

Female.—Unknown.

From one male taken at White Mountains, Arizona, by H. W. Henshaw, August, 1873.—*Edwards, l. c.*

ARGYNNIS APHRODITE, Fabr.

Argynnis Aphrodite, EDW., Butterflies N. A., i.

This species was taken by the expedition in Arizona, and occurs also in Colorado, though it is very rare. These far western specimens differ considerably from the usual eastern type in being of a deeper hue; the males especially being darker red-brown below.

†ARGYNNIS NAUSICAA, Edw.

Argynnis Nausicaa, EDW., Trans. Am. Ent. Soc., v.

Male.—Expands 2.5 inches. Primaries strongly arched, moderately produced; hind margin straight.

Upper side deep-red fulvous on primaries, brightest on outer limb of secondaries, much obscured on basal area of each wing, but especially on secondaries, the dark portion reaching quite to the mesial band; hind margins edged by two heavy parallel lines, inclosing very narrow fulvous spaces throughout, divided by the black nervules; the submarginal lunules large, not touching the marginal lines, and inclosing spots of the ground color, except at apex of primaries, where they are paler; the rounded spots large; the mesial band heavy, confluent on secondaries; the marks in cell of primaries as in the allied species; on disk of secondaries a mark like the letter C inverted; fringes fulvous, fuscous at ends of nervules.

Under side of primaries almost wholly cinnamon-red, there being but a ferruginous patch near apex and buff in the middle of the subcostal interspaces; the markings repeated; the submarginal lunules black, the upper ones edged above by buff; the four or five inclosed spots next apex lightly silvered. Secondaries dark ferruginous, mottled very slightly with buff; the band between the two outer rows of spots clear buff, narrow, much encroached on by the ground color; all the spots well silvered; those of the outer row long, narrow next inner angle, lunular, and broad on the upper half of the wing, all edged anteriorly by ferruginous; of the second row, the first and fifth are largest and equal, long semi-oval, the sixth same shape, one-half the size of the fifth; the second and third equal, long, and narrow; the fourth minute; the seventh sublunate, all edged anteriorly by black; the third row of three spots sublunate, edged with black, in the cell two round spots, and below cell an oval, all ringed with black; a silver spot in subcostal interspace; the shoulder and inner margin lightly silvered.

Body dark fulvous, beneath gray fulvous on thorax; the abdomen buff; legs buff; palpi buff at sides, fulvous in front and at tip; antennæ fuscous above, fulvous below; club black; tip ferruginous.

Female.—Same size. Upper side deep fulvous, less obscured at base; the marginal lines on primaries confluent, and the lunules large, resting on the lines; the inclosed spots whitish next apex.

Under side of primaries as in the male, except that the upper outer part of cell is buff as well as the subcostal interspaces; on the ferruginous

patch a silver spot; the upper submarginal spots well silvered; secondaries more decidedly mottled with buff; the band still narrower.

From 2 ♂, 1 ♀, taken by H. W. Henshaw, August 21, 1874, at Rocky Cañon, Arizona.—*Edwards, l. c.*

ARGYNNIS HALCYONE, Edw.

Argynnis Halcyone, Edw., Butterflies N. A., i.

This species was found here and there toward the southern border of the South Park, Colorado. A worn female probably of this species was taken near Cañon City, September 20, though two weeks before the frost had put an end to all collecting in the mountains and South Park.

ARGYNNIS ATLANTIS, Edw.

Argynnis Atlantis, Edw., Butterflies N. A., i.

A few *Atlantis* were taken at 7,500 and 8,000 feet elevation in Colorado during June and July, both in the Platte and Arkansas valleys. This species emits a powerful musky odor when pinned, a peculiarity not noticed, so far as I am aware, in others of the genus.

ARGYNNIS HESPERIS, Edw.

Argynnis Hesperis, Edw., Butterflies N. A., i.

A. Hesperis appears at 7,500 feet elevation in Colorado during the latter part of June; the males much frequenting muddy spots in the road. They are very wary and difficult to catch in such situations, though after an alarm they frequently return to the same spot in the course of a few minutes. Farther up the mountain side, both sexes may be taken at flowers, especially those of the Horse-mint (*Monarda*). It was found sparingly near Fairplay, at Twin Lakes, and not far from the Middle Park, on the Georgetown road; but Turkey Creek Junction seemed to be the only locality where the species occurred in any number.

ARGYNNIS EDWARDSII, Reakirt.

Argynnis Edwardsii, Edw., Butterflies N. A., i.

In Colorado, this species is quite abundant, even on the plains in the immediate vicinity of water courses. Near Denver, on the banks of the Platte, it appears in the latter part of May. It is found also in the mount-

ains at all elevations up to timber line, and continues on the wing till late in August. Like many other *Argynnides*, the species becomes very scarce after its first appearance; in August suddenly re-appearing, the females seeming fresh though never quite perfect, while the males are old and worn.

At this time, the females begin to lay their eggs, and do not finally disappear until killed by the September frosts.

†ARGYNNIS NEVADENSIS, Edw.

Aryynnis Nevadensis, EDW., Butterflies N. A., i.

This species seems to represent *A. Edwardsii* on the Pacific slope of the Rocky Mountains. It was originally discovered by Mr. Henry Edwards near Virginia City, Nev., and subsequently brought by the expedition from Southern Utah.

ARGYNNIS MEADII, Edw.

Argynnis Meadii, EDW., Trans. Am. Ent. Soc., 1872.

One specimen of this species was taken by me in Colorado at Turkey Creek Junction on the 6th of June. Several specimens have been brought from Montana.

The three closely allied species, *Edwardsii*, *Nevadensis*, and *Meadii*, seem to be related to each other in very much the same way as the eastern *Aphrodite*, *Cybele*, and *Atlantis*. In *Edwardsii*, the pale submarginal band below is narrower and sometimes almost obsolete, as in *Aphrodite*, and it ranges up to greater elevations than *Nevadensis*, which has this band comparatively broad in both sexes, as we see in *Cybele*. *Meadii* differs from either in tint, especially in the female; it is somewhat smaller, and probably, like *Atlantis*, is exclusively confined to the mountains. The peculiar bright-green coloration of the under side of secondaries in *Meadii*, however, has no parallel among our fritillaries.

ARGYNNIS EURYNOME, Edw.

Argynnis Eurynome, EDW., Trans. Am. Ent. Soc., 1872.

A. Eurynome was brought by the expedition from Twin Lakes, 1873. I found my first specimens, July 6, at Fairplay. After this, the species became quite abundant. It was taken in all parts of the South Park, on the Continental Divide, and in the Middle Park. A single specimen was

taken in California Gulch, which showed no trace of the usual silvering on the under side.

A female was placed in an ordinary tin vegetable can containing violet plants, and top covered by a cloth. Numerous eggs were obtained These are more rounded than those of *Atlantis*, and their marking is more delicate.

ARGYNNIS MYRINA, Cramer.

Argynnis Myrina, HARRIS, Insects Injurious to Vegetation.

A few specimens were found in the Middle Park, Colorado, early in August. The species is said to occur in California.

ARGYNNIS BELLONA, Fabr.

Argynnis Bellona, HARRIS, Insects Injurious to Vegetation.

A single specimen, fresh from chrysalis, was taken near the Hot Springs, Middle Park, August 14.

The larva of *Bellona* resembles more closely that of *Cybele* than that of *Myrina*, thus affording additional evidence of the artificial character of the genus *Brenthis* erected to contain these smaller *Argynnides*.

ARGYNNIS EPITHORE, Boisd.

Argynnis Epithore, EDW., Proc. Ent. Soc. Phila., 1864.

Specimens from Colorado differ from Pacific coast individuals in having the dark markings of the upper side coalescent toward the base; below, the secondaries are darker purple, and show slight differences in the arrangement of the median band of spots. In Colorado, the species frequents the same localities as *A. Freya*, and has similar habits, but appears from one to two weeks later in the season, disappearing about the last of June. Both were found on Beaver Creek, near Fairplay, and near the Kenosha House, four miles from the South Park; elevation, 9,000 feet.

ARGYNNIS FREYA, Thunberg.

Argynnis Freya, GODART, Encyc. Méth. IX.,

A. Freya occurs in Arctic Europe, Labrador, and Colorado. It is first to appear of the small species of *Argynnis*. In May, or early in June, it may be found in some numbers near the South Park.

The small mountain streams in Colorado often widen and form swampy belts, perhaps fifty yards in width, overgrown with willows, grass, and herbage; violet plants are also abundant. Such boggy places are the favored resort of these butterflies. They often alight on the bushes and also on flowers, when alarmed flying up like some moth. Their wings move rapidly, and in this respect almost remind one of *Alypia*. The species almost entirely disappears by the 20th of June.

ARGYNNIS TRICLARIS, Hübn.

Argynnis Triclaris, HÜBN., Exotische Schmetterlinge.

The first specimens of this species were taken near the Kenosha House, June 29, but it was found more abundantly near Fairplay.

The species has been considered a mere Arctic variety of a European species (*A. Aphirape*, Hübner), but all the Colorado specimens show great uniformity of marking; and the asserted existence of intergrades upon the continent of Europe cannot affect the status of our species, though perhaps furnishing an indication of the origin of the European form, as it would seem probable that the widely distributed and hardy *Triclaris* may be the parent species.

The last specimen of *Triclaris* was taken in the Arkansas Valley, July 14; the species seems to be rather local, though abundant near Fairplay.

ARGYNNIS HELENA, Edw.

Argynnis Helena, EDW., Trans. Am. Ent. Soc., 1871.

This species is nearly allied to *Chariclea*, Herbst, and seems to be its Rocky Mountain representative. It inhabits the highest peaks, and was found throughout all parts of the Snowy range which were visited. At 13,000 and 14,000 feet, though the temperature must descend below the freezing point every night through the summer, the species seems perfectly at home, and is often more abundant than below. Specimens may be found until the first of August.

MELITÆA, (Fabr.) Westwood.

MELITÆA CHALCEDON, Doubleday.

Melitæa Chalcedon, EDW., Butterflies N. A., i.

Said by Reakirt to be found in the Rocky Mountains. I took one

specimen at Turkey Creek Junction, which may be referable to this species, but it is certainly not a common species in the Territory.

MELITÆA ANICIA, Doubleday.

Melitæa Anicia, EDW., Proc. Ent. Soc. Phila., 1862.

The expedition of 1873 took this species in the South Park, Colorado; I did not meet with it in the Territory. Mr. Henry Edwards writes concerning it:—

"About this species there has been considerable confusion, Boisduval having unhesitatingly stated its identity with *Editha*, Boisduval. This, however, is an error. In a long series of this species, the form of the wing will alone be sufficient to distinguish the two forms.

"In *Editha*, the apices are rounded, and the wings are broader than in *Anicia*, while the ground color of the latter may be called red, that of *Editha* being black with red and white tessellations. *Anicia* is a mountain species, and is extremely abundant near Virginia City in May. I have taken it in several spots in the Sierra Nevada, particularly in Bear Valley, Placer County, and near Donner Lake. The caterpillar has been described to me as wholly black, feeding on a species of *Prunus*, but I am unable to verify this statement from my own observations. I am inclined to think that *M. Nubigena*, Behr. will be found to be a depauperated form of this species."

MELITÆA NUBIGENA, Behr.

Melitæa Nubigena, BEHR., Proc. Cal. Acad. Nat. Sci., 1863.

M. Nubigena is quite common throughout the mountain district of Colorado in June and July. Several larvæ, probably of this species, were found, usually near the ground, concealed in the herbage or on the stems of their food plant, an indigenous species of *Plantago*. The ground color of these larvæ is white, slightly marbled with black; the head is black, bilobed, hairy. On the second segment is a black, collar-like mark. Each of the succeeding segments, except the last, bears seven black spines, finely bristled. The bases of the dorsal row yellowish; those of the adjacent rows black, and so on, alternating. Length, 1 inch. One larva suspended itself June 19, and became a chrysalis the next day. Pupa whitish-gray, marked with black and yellow dots, much as in *Phaeton*.

Unfortunately, none of the specimens reached maturity, so that the species remains a matter of conjecture; but *Nubigena* is by far the most abundant *Melitæa* in their locality.

MELITÆA EURYTION, Edw.

Melitæa Eurytion, EDW., MS.

This species is found associated with *Nubigena* in Colorado, but is much rarer, and does not seem to range to quite so great elevations. The most obvious point of distinction from *Nubigena* is that the yellow spots of the latter are largely obscured in *Eurytion* by fulvous.

†MELITÆA LEANIRA, Felder.

PLATE XXXVII, FIGS. 5, 6, 7, 8.

Melitæa Leanira, FELDER., Lep. Frag. Wien, 1859.

This species, which is by no means rare in California, has been taken in Southern Arizona by the expedition.

†MELITÆA PALLA, Boisd.

Melitæa Palla, BEHR, Proc. Cal. Acad. Nat. Sci., 1863.

This species was taken by the expedition of 1871, probably in Utah or Nevada. It is not known to occur in Colorado. Mr. Henry Edwards writes regarding it:—

"This is one of the commonest and most variable of Pacific coast butterflies, and is found in every cañon in California and Oregon from April to July. It is dimorphous—one form of the female being blackish, while the other is foxy-red. All intermediate grades are found, and suffused varieties are by no means rare.

"On a sunny day in May, this insect may be seen in countless numbers settling upon flowers; and as it is rather a lazy species, good specimens are easily obtained. The form described by Dr. Behr as *M. Whitneyi* is, I think, only a mountain variety, as I have recently met with some specimens near San Francisco which bear a remarkable resemblance to his types."

"*Larva.*—Dull-black, with a double dorsal row of orange spots, forming, when viewed longitudinally, two interrupted lines. In the spaces between the spots are some irregular white patches. Along the sides are two simi-

lar double rows of orange blotches, with white spaces about the spiracles. The spiracles themselves are black. Each segment is provided with five rather long spines, from each of which project about sixteen or eighteen long black hairs. The base of each spine is surrounded by a dirty-white ring, and some minute white irrorations are scattered over the whole upper surface between the spines. Head rather small, black, very glossy. Feet ash-color, banded with black. Length, 1.05 inch. Food-plant, *Castilleja breviflora.*

"The caterpillars feed chiefly on the flowers, and are solitary in their habits, only one being usually found on each plant.

"*Chrysalis.*—Fawn-color, very faintly marked with pale-brown dots and dashes over the entire surface. On the thorax are two raised, shining points, and each of the segments, except the two last, possess a treble row of small, shining tubercles."

†MELITÆA HOFFMANNII, Behr.

Melitæa Hoffmannii, BEHR, Proc. Cal. Acad. Sci., 1863.

This species was also brought in by the expedition of 1871, but is not known from Colorado. Of it Mr. Henry Edwards writes:—

"*M. Hoffmannii*, Behr.—A very distinct and rather rare species, found only in the warm valleys of the Sierra Nevada, where it loves to fly among the flowers of *Compositæ*, and particularly the various species of *Artemisia.* I have taken it from May to July, but only at distant intervals, and never at a less altitude than from 2,500 to 3,000 feet above the sea level."

MELITÆA CALYDON, Edw.

Melitæa Calydon, EDW., MS.

M. Calydon was only found at Turkey Creek Junction, Colorado, June 20 to 30. About twenty-five specimens were taken. This species is allied to *Palla* of California, to which the males are very similar; the resemblance between the females, however, is less noticeable.

MELITÆA ARACHNE, Edw.

Melitæa Arachne, EDW., Trans. Am. Ent. Soc., 1869.

This species was quite rare, but occurred here and there in the mountain district below 9,000 feet, and one specimen was also taken on the plains

near Denver. Specimens were taken on Turkey Creek in June, at Twin Lakes about the middle of July, and near Denver on the 20th of August; this last specimen was quite fresh, so probably there is a second brood in the warmer parts of Colorado.

†MELITÆA MINUTA, Edw.

PLATE XXXVI, FIGS. 1–2.

Melitæa Minuta, EDW., Proc. Acad. Nat. Sci. Phila., 1861, 161.

This beautiful species, originally described from Texas by Mr. Edwards, was taken in the vicinity of Santa Fé, N. Mex., bv Mr. H. W. Henshaw. Not known to occur in Colorado.

† MELITÆA ACASTUS, Edw.

Melitæa Acastus, EDW., Trans. Am. Ent. Soc., 1874.

Male.—Expands 1.5 inches. Size and form of *M. Palla; paler fulvous;* the spots and bands closely like that species, and on a fuscous ground; fringes similar also.

Under side of primaries pale fulvous, reddish next base and across the disk next the submarginal spots, yellow fulvous at extremity of and below cell and along the origin of the nervules; a fuscous patch on middle of inner margin, and four fuscous, rounded spots forming a bent oblique line reaching from costal edge to median nervule; hind margin edged by a narrow fulvous band, slightly wavy on inner edge; submarginal spots large, lanceolate, yellow-white, the three next inner angles suffused with fulvous; the three subapical spots yellow-white on fuscous ground; costal edge yellow-white.

Secondaries nearly covered with large yellow-white spots, in bands, separated by fuscous lines; the marginal edge bordered as in primaries; the submarginal spots lunular; the spots of second row small, subrectangular, and each except the two outer having a minute orange spot near its posterior edge, sometimes represented by a few scales only; the spots of the third, or discal row, long, conforming to the interspaces, almost a continuous band, the nervules that divide them being but partially fuscous; the anterior portion of these spots, on both margins, cut off by an irregular black line; the fourth row is basal and is separated from the third by a

broad space, and consists of four irregular, confluent spots; the outer edges of the band thus formed edged with black; the fourth spot confluent with the concolored abdominal margin; in cell, an orange bar on either side the triangular spot; a similar bar in the interspace above cell, and an orange lunule in submedian interspace next submedian nervure, and a small orange triangle at origin of lower branch of median; an orange bar also next the basal side of the fourth band. Body above black, with fulvous hairs; rings of abdomen edged with yellow; below, thorax and abdomen yellow-white; legs pale fulvous; palpi same above, yellow-white in front; antennæ fuscous, with narrow, white rings, below orange cretaceous next base; club fuscous, orange below and at tip.

Female.—Expands 1.9 inches. Color of upper side sometimes like male, sometimes paler. In some individuals, the submarginal spots and the third, or discal row, are paler than the rest of the wing, and the three outer rows on primaries likewise paler. Under side similar in color and markings to male.

From Montana, Nevada, and Southern Utah. Specimens have been received from the geological expedition for exploration of the Territories, and from this survey of 1872; also from Henry Edwards, esq. This species is at once distinguished from its allies by the yellow-white under surface, especially of secondaries; this color nearly occupying the whole wing.—*Edwards, l. c.*

PHYCIODES, Hübn.

PHYCIODES NYCTEIS, Doubleday.

Phyciodes Œnone, Scud., Proc. Essex Inst., 1863.

Occurs occasionally in the mountains at about 7,500 feet elevation late in June. Colorado specimens are much darker than those from the Eastern States; the black sometimes covering two-thirds of the surface above. Specimens from Texas in my collection are about intermediate between this heavily marked form and the usual eastern type.

PHYCIODES CARLOTA, Reak.

Phyciodes Carlota, Reakirt, Proc. Ent. Soc. Phila., 1867.
M. Ismeria, 1833, Boisd. (never recognizably described or figured).

Not uncommon at the lower levels and near Denver. Females much

worn were taken early in June, so it is probable that the species appears about the first of May on the plains, though somewhat later in the mountains. None were seen in the neighborhood of the South Park at above 8,000 feet.

PHYCIODES THAROS, Boisd.

Phyciodes Tharos, HARRIS, Insects Injurious to Vegetation.

P. Tharos was found quite abundantly on Turkey Creek with *Carlota* and *Nycteis*. Like the latter, these are slightly darker than eastern specimens, but otherwise quite indistinguishable.

PHYCIODES MARCIA, Edw.

Phyciodes Marcia, EDW., Trans. Am. Ent. Soc., 1868.

With *Tharos* were also found one or two specimens of *Marcia*, in no wise differing from types of the species. It was also taken by the expedition in 1871, but the precise locality is not given.

PHYCIODES PALLIDA, Edw.

Phyciodes Pallida, EDW., Proc. Ent. Soc. Phila., 1864.

Brought by the expedition from Southern Utah. One specimen was taken in Colorado, probably at a low elevation.

PHYCIODES MATA, Reakirt.

Phyciodes Mata, REAKIRT., Proc. Ent. Soc. Phila., 1867.—STRECKER, Illustrations Lepidoptera, 1874.

The type of this species was collected in Colorado; since then none have been seen. The original description states that the specimen was bleached and faded. This is contradicted by Mr. Strecker in No. 8 of his "Illustrations", because the specimen had not been exposed to light after its capture; but I have taken several specimens of a *Phyciodes* near Salt Lake City, which had certainly been bleached by the action of the weather, and it seems to me probable from the figure and description that *P. Mata* is a faded specimen of *P. Pallida*, having the pale bands slightly more pronounced than in the usual type. This manner of variation is well exemplified in *P. Camillus*, the females of which sometimes have the usual yellow median and marginal bands pure white below (var. *Emissa*, Edwards).

PHYCIODES CAMILLUS, Edw.

Phyciodes Camillus, EDW., Trans. Am. Ent. Soc., 1871.

This is the most abundant *Phyciodes* in the mountains of Colorado, and is found at all elevations below timber line during the whole summer. These butterflies are very fond of flowers but do not often congregate at wet spots in the road like *Tharos*. Some of the males resemble that species quite closely, though of a different shade of fulvous above, and the under surface more resembles *Batesii*, Reakirt. The females are quite distinct; the most nearly allied species is the Californian *P. Pratensis*, Behr.

†PHYCIODES CANACE, Edw.

Phyciodes Canace, EDW., Proc. Am. Ent. Soc. Phila., 1871.

The type of this species was taken in Southern California. The only other known specimens are those collected by the expedition in 1871, probably in Arizona.

† PHYCIODES MYLITTA.

This species is not known to occur on the eastern slope of the Rocky Mountains; but the expedition obtained specimens from Southern Utah and Arizona.

Mr. Henry Edwards writes me as follows concerning its habits:

"*Ph. Mylitta* is a common species in California, appearing about April, and apparently double brooded, as I have taken fresh specimens as late as August. It is an extremely restless insect, much more so than any other of the genus with which I am acquainted, and, though settling frequently, it rarely remains long in one place. The larva feeds on various species of thistles (*Carduus*, *Cnicus*, &c.). Its published description is as follows:—Head small, bronze-black, entirely covered with short black hair. Viewed from above, the whole upper surface is velvety black, each segment being provided with six tubercular spines, very hairy to their tip. The lateral row of spines is dull ash color, with black hairs; the spines being shorter than those of the dorsal region. Feet and pro-legs dull ash color; the underside of the body with a fleshy tinge. Length, 0.75 inch. This species is gregarious in its habits, and terribly destructive to the plant on which it may be hatched; in many cases only the nerves of the leaves remaining. The caterpillars spin

a small web, and draw the leaves of the plant together. Chrysalis, ash color, with a slight metallic reflection. Dorsal region with three rows of slightly raised tubercles. The anal extremity is much incurved."

SYNCHLOE, Boisd.

†SYNCHLOE CROCALE, Edw.

PLATE XXXVII, FIGS. 1, 2, 3, 4.

Synchloe Crocale, EDW., Trans. Am. Ent. Soc., 1874.

Male.—Expands 1.7 to 1.9 inches. Upper side brownish black, spotted with white; primaries have a submarginal row of points, sometimes complete from apex to lower branch of median, but usually in part obsolete, the two spots on first and second median interspaces only appearing; a sinuous extradiscal row of points or small spots across the entire wing, seven in all, but sometimes the one next inner margin accompanied by an eighth; a discal row of conspicuous spots, also sinuous, usually incomplete by the absence of one spot from upper median interspace; this spot when present minute, and a narrow spot in cell often wanting; secondaries have a transverse row of spots on middle of wing, which are regular, narrow, elongated, and equal; at anal angle, a fulvous patch, which extends a little distance up the abdominal margin; fringes white; black at tips of nervules. Under side more decidedly brown; the spots on primaries repeated; the submarginal enlarged, mostly lunate; the extradiscal also enlarged; the discal nearly as above; two spots in cell, one near arc, one near base; a third below the origin of lower branch of median; shoulder ferruginous; secondaries have a submarginal series of yellow lunules; a broad yellow band across disk; a narrow yellow stripe near base, from costal edge to submedian nervure; half way between submarginal spots and discal band a series of yellow points, tortuous, commencing on costal margin near the band, crossing the wing in a double curve, the last point being on submedian interspace; these marks vary from points to conspicuous spots, and sometimes are nearly or quite obsolete; in middle of cell a yellow point; anal spot as above, ferruginous; the upper part of abdominal margin edged with yellow; a yellow patch on shoulder.

Body above blackish-brown, below gray-brown; legs ferruginous;

palpi white in front, black above and at tip; antennæ fuscous, finely annulated with white; club black above, gray below, fulvous at tip.

Female.—Expands 2.1 inches. Similar to male. In the only specimen examined, the fulvous patch at inner angle of secondaries was absent. Below cell of primaries two white points.

From several males and one female, taken at White Mountains, Arizona, in 1873, by H. W. Henshaw, of this expedition.

I submitted one of these specimens to Mr. A. G. Butler for determination, and he informed me that two examples from Mexico were in the British Museum collection, and that they were regarded by him as a distinct species, allied to *Lacinia* and *Hippodrome.—Edwards, l. c.*

GYROCHEILUS, Butler.

GYROCHEILUS TRITONIA, Edw.

Geiroeheilus Tritonia, Edw., Trans. Am. Ent. Soc., 1874.

Male.—Expands 2.3 inches. Upper side velvety, blackish-brown, changing to brown on hind margin of primaries, with an olivaceous tint at apex; costal edge of primaries near apex yellow-white; beyond disk a transverse row of four white points, set in middle of the upper discoidal, and three next lower interspaces; the last point sometimes wanting on upper side; secondaries have a broad marginal band of dull ferruginous, even-edged within, reaching the margin on that part of wing between submedian nervure and the upper branch of median, beyond this last receding from the margin, but usually continued past the upper branch of sub-costal, and gradually diminishing to a point, sometimes, however, terminating squarely at the lower branch of same nervure; through this band runs an indistinct undulating brown line, parallel to and near the margin; beyond upper branch of median the space between this line and margin is brown, color of apex of primaries; fringes of primaries black at tips of nervules, yellow-white in the interspaces, of secondaries nearly all fuscous, there being but a few gray hairs in each interspace.

Under side smoky-brown; the white spots repeated, enlarged three fold, each forming the pupil of a rounded, black ocellus; secondaries have a broad extradiscal band, ferruginous and lilac, with scattered yellow scales

on the posterior half of wing, lilac on brown ground apically; on the anterior edge of the band, upon small ferruginous spaces free from lilac, is a row of straw-colored points and spots, commencing in a point on the lower subcostal interspace, and continuing to submedian nervure, just before which are two points; the three spots on the three median interspaces crescent or V-shaped; in some cases these larger spots re-appear on upper side; posterior to the band the submarginal area is brown, sharply lunated, each lunation forming internally a semi-circle, and through all runs a streak of ferruginous, more or less irrorated with yellow; sometimes the streak is limited to the three interspaces next abdominal margin.

Body blackish-brown; legs brown and gray; palpi gray in front, blackish above and at tip; antennæ brown, grayish next club, gray below; club yellowish.

From White Mountains, Arizona, and taken by H. W. Henshaw in 1873. This species is near *Patrobas*, Hewitson.—*Edwards, l. c.*

GRAPTA, Kirby.

GRAPTA SATYRUS, Edw.

Grapta Satyrus, Edw., Butterflies N. A., i.

A single specimen, taken on the 24th of June, at Turkey Creek Junction, shows this species to be an inhabitant of Colorado, but it must be extremely rare, as no others were seen during the season. This species approaches more nearly the usual type of the European *C. album* than any of the numerous other American species which have been confounded with that very variable butterfly; however, the discovery of the larva of *Satyrus* has proved its distinctness beyond a doubt. *Grapta C. album* varies toward all the forms which are represented by distinct species on this side of the Atlantic, and, also, toward several besides, while our corresponding species are all remarkably constant to their types, and a glance will show to which species any specimen should be referred. It may help to explain these facts to take into consideration the differences in the geological history of the two continents. As the genus is confined to temperate climates, it is quite possible that its archetype could not be produced or exist during a geologic era when the earth was so heated as to maintain a torrid temperature over its whole surface. At the close of this period, the climate of Central North

America passed at once to a warm-temperate on account of the extension of the continent into the arctic zone, while the climate of Europe passed in succession through a tropical and then subtropical condition before becoming adapted to the well-being of organisms requiring a moderate temperature (see Dana, Geology, p. 532). Hence we may regard these varieties of *C. album* as nascent species; our corresponding forms, having been long subjected to the action of natural selection and other segregating causes, have established themselves as independent species.

GRAPTA HYLAS, Edw.

Grapta Hylas, Edw., Trans. Am. Ent. Soc., 1872.

This pretty species seems quite local; in this respect resembling its near congener, *G. Faunus*. The first specimens were seen quite high up the mountain, near Berthoud's Pass, August 16, where, at a small patch of flowering plants, fifteen specimens were netted in the course of half an hour. A few *G. Zephyrus* were seen in the same locality. On the 28th, about twenty miles from the South Park, on the South Park road, a few more were found, with many *Zephyrus* and some *Vanessas*.

G. Hylas is uniformly smaller than *Faunus*, and the exquisite gray marbling of the under surface is quite different from the marking of any *Grapta* with which I am acquainted.

Mr. Scudder has ranked this species as a dimorphic form of *G. Zephyrus*, but for this he gives no reason, and I am at a loss to imagine one, unless it be assumed that every *Grapta* is necessarily dimorphic, and that only *Hylas* can correspond to *Zephyrus*.

It seems to me, though possible, highly improbable that this will prove to be the case, as *Zephyrus* is much like *Progne*, and the characteristic mark of the under surface of secondaries is angular as in that species, while that of *Hylas* is a well formed C, resembling the mark of *Faunus* or *Comma*.

It seems also unnecessary to create a possible synonym for *Zephyrus* true type (= var. *Thiodamas*, Scudder) before any experiments in rearing the two species have been made. The case of *Faunus* and *Gracilis* is similar to this, and here the only experiment in rearing which has been tried gave a negative result; the female *Gracilis*, which Mr. Scudder obtained, refused to lay eggs upon the food plant of *Faunus* (willow), and thus died.

GRAPTA ZEPHYRUS, Edw.

Grapta Zephyrus, EDW., Butterflies N. A., i.
P. Zephyrus var. *Thiodamas*, SCUD., Syn. List, 1875.

This was by far the most abundant species of its genus in Colorado. It was first seen June 5 at Turkey Creek (7,500 feet), but did not appear until about three weeks later near the South Park (9,000 feet). About twenty-five specimens were taken in June; probably these all had hibernated. Scarcely any were seen in July, while in August about thirty more were captured. The species was brought by the expedition from Arizona and Southern Utah. It is not uncommon in California.

VANESSA, (Fabr.) Westwood.

VANESSA ANTIOPA, Linn.

Was seen here and there through the mountain region, but was not common. It was brought by the expedition from Arizona and Utah.

VANESSA MILBERTII, Godart.

Vanessa Milbertii, HARRIS, Insects Injurious to Vegetation.

In the waste places, on the outskirts of Denver, nettles were abundant, and early in June almost every plant had upon it many caterpillars of *V. Milbertii*, in various stages of growth, and the females were still depositing their egg clusters. Some of the larvæ were reared, the perfect insects emerging early in July. The species is found throughout the mountains in considerable numbers.

VANESSA CALIFORNICA, Boisd.

Vanessa Californica, BOISD., Ann. Soc. Ent. de France, 1852.

But three or four specimens were seen in Colorado, all near Turkey Creek, toward the last of June. They alight frequently in the road, or on tree trunks, but are wary and difficult to approach.

PYRAMEIS, Hübner.

PYRAMEIS HUNTERA, Drury.

Cynthia Huntera, HARRIS, Insects Injurious to Vegetation.

Not at all a common species. One or two specimens were taken about the middle of June, and also later in the season in Colorado. The expedition also found the species in Arizona.

PYRAMEIS CARDUI, Linn.

Occurs here and there in Colorado and Utah in about the same numbers as *Huntera.*

†PYRAMEIS CARYE, Hübner.

Was brought in by the expedition of 1871, probably from Arizona. It is abundant in California; specimens may often be seen even in the streets of San Francisco.

PYRAMEIS ATALANTA, Linn.

Was met with, now and then, wherever nettles were abundant.

LIMENITIS, Fabr.

LIMENITIS WEIDEMEYERII, Edw.

PLATE XXXVIII, FIGS. 1, 2.

Limenitis Weidemeyerii, EDW., Butterflies N. A., i.

A specimen was taken June 6, but no more were seen until the 24th, in Colorado. By the last of July, the species has entirely disappeared. It frequents the banks of small creeks and neighboring road sides in the mountains, but at not more than 7,500 or 8,000 feet above the sea level. The expedition took specimens in Southern Utah and Arizona; those from the latter locality unusually large and handsome.

APATURA, Fabr.

†APATURA LEILIA, Edw.

Apatura Leilia, EDW., Trans. Am. Ent. Soc. Phila., Oct., 1874.

In markings allied to *Celtis*, but with the shape of *Clyton*, the primaries being more produced and hind margin more excavated than in *Celtis;* the hind margin of secondaries more sinuous, and the inner angle more produced.

Male.—Expands 1.8 inches. Upper side of primaries next base, and partly in the median interspaces, and of secondaries throughout, light red-brown; the remainder of primaries, which comprises the apical area to median and to cell, and the discal portion of the median interspaces, fuscous; hind margins bordered narrowly by fuscous; both wings have a submarginal black stripe, and a little anterior to this, a second, which on seconda-

ries is either very slightly crenated, or is crenated next outer angle, and serrated posteriorly; primaries have a transverse discal row of seven white spots arranged in a double curve, the first two and fifth nearly equal, the third and fourth minute, the sixth and seventh, near inner margin, equal, rather smaller than the fifth, and sometimes confluent; midway between this row and the margin is a second row of white spots and ocelli, the spots, two in number, being placed on the upper subcostal and the discoidal interspaces; the three ocelli, on the lower subcostal and the median interspaces, are black, rounded, the upper one small, with an indistinct pale iris, the others large, nearly equal, and each surrounded by a pale-brown nimbus; in the cell, two transverse, equal, subreniform spots, one at the outer extremity, the other near the middle; these spots are obscure brown centrally, black at the edges, and are separated by a space that is white, irrorated with brown scales.

Secondaries have the costal margin fuscous; upon the extradiscal area a series of six black ocelli arranged as in *Clyton* and *Celtis*, the second from costa largest and back of the line, the sixth minute, the others nearly equal, rather more than half the size of the second ; each surrounded by a shade slightly paler than the ground, and several having within small eccentric clusters of blue scales; on the middle of costal margin a white patch, and five small, white spots in line with this pass round the extremity of the cell; in the cell, two faint fuscous spots; fringes white in the emarginations, fuscous at the ends of the nervules.

Under side of primaries chestnut-red at base below the cell, also within the cell next base, but partly covered with gray, especially along the subcostal nervure; remainder of wing pearl-gray, showing a brown subcolor on disk, and in the middle of each interspace on the apical area, and at inner angle; the gray becoming suffused with pale-blue as it approaches the hind margin; this margin narrowly edged with yellow-brown; the submarginal lines repeated, distinct, blackish-brown; the white spots repeated, enlarged, and in addition a white patch in the outer row on costa; the lower spot of this row, in discoidal interspace, nearly conceals a small ocellus, a narrow edge of black being discernible on the anterior side, and the yellow iris being nearly complete; the other three ocelli re-appear,

enlarge, each with blue scales and a well-defined yellow iris; the cellular spots as on upper side, the intervening space being clear white.

Secondaries pearl-gray, tinted with blue near hind margin; the gray shade least dense on the disk next before the ocelli, allowing a brown subcolor to appear; the submarginal lines repeated; the inner margin also bordered by a brown line; the white discal patch and spots repeated, and the line of spots extended across the wing to inner margin, following the course of a dark, wavy line; the spots in the cell distinct, being transverse bars; the interior one prolonged into the next upper interspace; the ocelli repeated, and each containing a large, blue patch, and edged by a narrow, yellow ring, which itself is edged indistinctly by fuscous; an additional ocellus on the inner margin, small, oval, also marked with blue.

Body above reddish-brown, beneath gray on thorax, yellowish on abdomen; legs ochraceous, the tibiæ gray; palpi clear white, fulvous above and at tip; antennæ yellow-fulvous, partly annulated with white; club fuscous at base, yellow at tip.

From two ♂, taken by H. W. Henshaw, August, 1874, at Camp Lowell and in Sonoita Valley, Arizona.—*Edwards, l. c.*

LIBYTHEA, Fabr.

†LIBYTHEA CARINENTA, Cramer.

Libythea Carinenta, CRAMER, ii, pl. 108.

This rare species was brought in by the expedition of 1871, probably from near the borders of Mexico; it occurs also in Texas, and ranges southward to Brazil.

CŒNONYMPHA, Hübner.

CŒNONYMPHA OCHRACEA, Edw.

Cœnonympha Ochracea, EDW., Proc. Acad. Nat. Sci Phila., 1861.

This species was brought by the expedition from the South Park. It abounds throughout all the mountainous region of Colorado during June and July; but none were seen later than August. Seventy-five specimens were taken by me; they show no very great variations.

SATYRUS, (Latr.) Westwood.

SATYRUS NEPHELE, Kirby.

Hipparchia Nephele, HARRIS, Insects Injurious to Vegetation.

Two specimens were taken at Apex Gulch, just within the foot hills of the Rocky Mountains, early in August. No others were seen.

†SATYRUS WHEELERII, Edw.

PLATE XXXIX, FIGS. 1, 2, 3, 4.

Satyrus Wheelerii, EDW., Trans. Am. Ent. Soc., March, 1873.
Satyrus Hoffmani, STRECKER, Illustrations of Lepidoptera, June, 1873.

In the spring of 1873 Mr. Strecker called upon me, and noticing in my collection a specimen of this *Satyrus* ticketed *Wheelerii*, Edw., stated that he had possessed the species for some time, and at first had made out a manuscript description, supposing it distinct, but finally concluded it was merely a variety of *S. Gabbii*, Edw. In No. 4 of Mr. Strecker's "Illustrations of Lepidoptera", which reached me, I believe, in the early part of July, the species was figured as *Satyrus* var. *Hoffmani;* Mr. Strecker being under the impression that the name *Wheelerii* was yet unpublished. The latter name, however, has several months' priority, and must designate the species.

SATYRUS CHARON, Edw.

Satyrus Charon, EDW., Trans. Am. Ent. Soc., 1872.
Satyrus Œtus, BOISD., Ann. Soc. Ent. France.

This species was first met with near Twin Lakes on the 9th of July. It was quite abundant in the sage brush and on flowers at the edge of the lake. Later in the season, it was found in both the South and Middle Parks, though not so abundantly as in the Arkansas valley, whence the expedition also brought specimens. Altogether one hundred and thirty-one specimens were taken by me. In August, females were obtained and inclosed with grass; several eggs were laid; they are whitish and very similar to those of *Nephele.*

†SATYRUS ARIANE, Boisd.

Satyrus Ariane, BOISD., Ann. Soc. Ent. France, 1853.

This species, though rare, is known to occur in California and Nevada. It was brought from Southern Utah by the expedition.

SATYRUS MEADII, Edw.

Erebia Meadii, EDW., Trans. Am. Ent. Soc., 1872.

While riding along the South Park road, this species was discovered near Bailey's ranch, about forty-five miles from Denver, and two specimens were taken on the 26th of August. None were to be found a few miles on either side of this point, so I returned and spent a week in observing the species and noting its habits. It must be very local, since, though not at all uncommon where first met with, none were seen elsewhere during the season. It evidently first appears there about the last of July, since nearly all the specimens were dilapidated, the males especially so. The species in mode of flight much resembles *S. Charon*, often alighting on dry bare spots in the grass and walking a few steps, then, after resting a few moments, flying off to some flower or other bare spot. A few eggs were obtained; they are like those of *Charon;* when first laid the eggs are nearly white, but in the course of two or three days become mottled with pale purple.

S. Meadii was at first referred to the genus *Erebia.* In some specimens, the fulvous spots in arrangement and tint are quite similar to *E. Epipsodea*, Butler; but the strongly dilated bases of the three principal veins of primaries would indicate that it is a true *Satyrus*, and this view receives support from the fact that the marking on the under side consists of short, transverse striæ, as in the undoubted *Satyri.* This, like *S. Ridingsii*, stands alone in a group, apart from the rest of the genus, and having no known analogues on this continent though similar species are found in Europe.

SATYRUS RIDINGSII, Edw.

Satyrus Ridingsii, EDW., Proc. Ent. Soc. Phila., 1865.

About the first of June, on the plains near Denver, a few specimens were found hiding in the short, parched grass, and flying up when disturbed, exactly as is the habit of *Drasteria* among the moths. The color of these butterflies harmonizes excellently with that of the dry herbage, and renders them quite difficult of detection, even when near at hand. It appears to be a rare species about Turkey Creek, but in the sage brush country, about Twin Lakes, (Arkansas Valley, 8,000 feet elevation), is very abundant in July, appearing there in company with *Satyrus Charon.* It is, however,

much less partial to flowers than is the case with that species, and has almost entirely the habits as well as the appearance of *Chionobas* rather than *Satyrus*. Specimens were brought from Southern Utah by the expedition.

EREBIA, Dalman.

EREBIA EPIPSODEA, Butler.

Erebia Rhodia, EDW., Trans. Am. Ent. Soc., 1871.

This species inhabits the mountains of Colorado below timber line. Specimens were brought from Fairplay by the expedition. It begins to appear about the first week in June, is common by the middle of that month, and remains until the last of July.

Dr. Staudinger, in a letter to me, claims that this species is identical with some varieties of the European *E. Medusa*. Not having specimens of the latter at hand, I cannot say how far this view may be well founded; but the species was originally described by Mr. Butler, of the British Museum, who certainly had abundant material for comparison, and it seems probable that the name will stand.

EREBIA TYNDARUS, Esper, var. CALLIAS, Edw.

Erebia Callias, EDW., Trans. Am. Ent. Soc., 1871.

Above timber line (about 11,000 feet) in Colorado, *E. Tyndarus* entirely replaces *E. Epipsodea*. It is a rare thing to find the former species below that elevation, though it is quite abundant on the bleak summits of the mountains. The first specimens seen were taken on the Arkansas divide, July 8, when six specimens were captured. A few were taken on peaks near Twin Lakes; but on recrossing the divide, July 21, the species had become much more abundant, and fifty specimens were secured in a short time. *E. Tyndarus* was also found on Mount Lincoln and Gray's Peaks. None were seen after the middle of August.

Dr. Staudinger, after receiving one or two specimens of this variety (*Callias*) of *E. Tyndarus*, wrote to me that the former was not a variety of *Tyndarus*, "because it was entirely identical with that species." After carefully examining all the European specimens at my command, it seems to me that there are sufficient differences to entitle our form to a separate des-

ignation as a variety, especially as those from Colorado are remarkably constant to their type; the seventy specimens taken showing scarcely a trace of variation among themselves. In comparing the two forms, the first noticeable point is the slender and delicate appearance of *Callias;* in specimens of each having the same breadth of wing the expanse of *Callias* is one-fifth greater than that of *Tyndarus.*

Among the minor points of difference may be enumerated the following:—In *Tyndarus*, on the under side of the primaries, the fulvous mark is bordered by a brown band parallel to the margin; while in *Callias* it shades off insensibly, extending much nearer the edge at the center of the outer margin than at the apex or external angle. The wavy bands and marbling are very indistinct in *Callias*, much more so than in any specimens of *Tyndarus* I have seen; and in the males it has almost exactly the appearance of moldiness. On the upper surface, the fulvous, which in *Tyndarus* forms five or six well defined spots, in *Callias* is represented by a patch, covering a considerable portion of the wing, and scarcely showing the nervures.

CHIONOBAS, Boisd.

CHIONOBAS SEMIDEA, Say.

Hipparchia Semidea, HARRIS, Insects Injurious to Vegetation.

C. Semidea is exceedingly rare in Colorado, and is only found on the extreme summits of the mountains. Near Twin Lakes, two specimens were taken, and others seen at an elevation of 13,000 feet, on a very steep mountain. The mountain side rose so precipitously that bowlders loosened near the top might sometimes be watched in their descent till lost to view three-quarters of a mile below; and just at the summit where these butterflies were found the ascent was even more difficult than lower down. The butterflies were very shy and wary; when alarmed, they usually flew, not along the side of the mountain, but either up or down, rendering pursuit almost impossible.

CHIONOBAS UHLERII, Reakirt.

Chionobas Uhlerii, REAKIRT, Proc. Ent. Soc. Phila., 1866.

C. Uhlerii was abundant in the lower mountain regions of Colorado, inhabiting grassy spots, and making only short flights when disturbed or otherwise, soon alighting and being lost to view in the short dry grass. It

may be found during the months of June and July. Seventy-three specimens were taken.

In this species, the number of ocelli above and the ornamentation of the secondaries below are quite variable. In some specimens, there is but a single ocellus—on the primaries; in others, four are present on the fore wings, and five upon the secondaries. On the under side of secondaries, some indication of the median band may generally be seen, but in some specimens the hind wings below are uniformly mottled with blackish transverse streaks; these about equally dividing the surface with the white ground color. In others, these streaks may become pale ochraceous, and quite indistinct on the outer half of the wing.

CHIONOBAS CHRYXUS, Hewitson.

Chionobas Chryxus, SCUD., Proc. Ent. Soc. Phila., 1865.

This *Chionobas* was found in more elevated regions than *C. Uhlerii*, still keeping, as a rule, below timber line. It was brought by the expedition from Gray's Peaks. My first specimens were taken July 8 on the Arkansas divide, in company with *Colias Meadii*, and other rare mountain species. It was not very uncommon by the road side. In the course of the day, eleven specimens were taken. One female was found with an egg adhering to the abdomen; this was white, melon-shaped, and considerably larger than the egg of *Satyrus Nephele*.

C. Chryxus seems to be found in small numbers through all the mountain region around the South Park, rarely, however, below 9,000 feet. None were seen after July.

THECLA, Fabr.

†THECLA HALESUS, Cramer.

Thecla Juanita, SCUD., Proc. Bost. Soc. Nat. Hist., 1868.

Brought in by the expedition of 1871. It is a subtropical species, and occurs from Florida to California.

THECLA CRYSALUS, Edw.

Thecla Crysalus, EDW., Proc. Am. Ent. Soc., 1873.

A few specimens of this perhaps the most beautiful of our Theclas were brought from Lake Pass, Colorado, by the Allen expedition of 1871. They were taken early in July.

THECLA NINUS, Edw.

Thecla Ninus, EDW., Trans. Am. Ent. Soc., 1871.

Three specimens of this species were taken on willow blossoms on the South Park road, four miles from the park, on the 17th of June. No others were seen during the season.

THECLA MELINUS, Hübner.

Thecla Humuli, HARRIS, Insects Injurious to Vegetation.

This was brought by the expedition from Colorado in 1871. I took one specimen, August 3, on the Georgetown road, in the mountains.

†THECLA SYLVINUS, Boisd.

Thecla Sylvinus, BOISD., Ann. Ent. Soc. France, 1852.

This Californian species was brought in by the expedition of 1871; but the precise locality was not noted.

†THECLA SIVA, Edw.

Thecla Siva, EDW., Trans. Am. Ent. Soc. Phila., 1874.

Male.—Expands 1 inch. Upper side castaneous, slightly brown at base; the costal margin of primaries and both hind margins rather broadly bordered with fuscous; secondaries have two tails, the outer one short, the other long, 0.16 inch; both dark fuscous, tipped with white; fringes fuscous.

Under side light fulvous, washed with pale metallic-green, densely on the costal and upper part of hind margins of primaries, and over the whole of secondaries; a common pure white band crosses the disks of both wings, on primaries a little convex outwardly, and formed of lunules which are not quite confluent; on secondaries, slightly wavy, and confluent; on the basal side of this band, the fulvous ground color is deeper than elsewhere, and on secondaries several of the white spots are edged by a line of black scales; between the band and base no spots or markings on either wing; secondaries have the hind margin edged with white, the outer angle fulvous; the interspaces along the margin between the discoidal nervules and anal angle gray, caused by black scales on a white ground; on the lower median interspace above, the gray patch is a rounded blackish spot on ferruginous ground, and

this, as well as the next patch on either side, is surmounted by a black lunule; anal angle black.

Body gray-brown above, beneath dark brown, with white hairs interspersed; the abdomen yellow-gray; legs dark brown and white; palpi white, fuscous at tip; antennæ annulated white and black; club black, tipped with pale fulvous.

From 2 ♂ taken by H. W. Henshaw at Fort Wingate, Ariz., July, 1874.

This species is allied to *Castalis* and *Smilacis*, being of similar size and shape. On the upper side deeper red than *Castalis;* on the under side there is much resemblance to *Castalis* in the shades of color and in the common band. But this last is much less irregular than in *Castalis*, in which the separate spots that compose the band are not confluent, and the two in the median interspaces are much behind the line of the rest. In *Siva*, the line is scarcely broken at this point, and is confluent. In *Castalis* are two conspicuous white spots nearer base of secondaries, which are not represented in *Siva*. *Smilacis* is fuscous on upper side, and below is most like *Castalis;* the band being very irregular and the two spots next base appearing.—*Edwards, l. c.*

†THECLA CALIFORNICA, Edw.

Thecla Californica, EDW., Proc. Acad. Nat. Sci. Phila., 1862.

T. Californica resembles *T. Cygnus* very closely. In the latter, however, the stigma upon the primaries of the male ends in a blunt point; in the former, it is rounded. The species was taken by the expedition in Southern Utah.

THECLA SÆPIUM, Boisd.

Thecla Sæpium, MORRIS, Syn. Am. Lep., 99.

The first specimens seen were near Apex Gulch, Colorado, August 3. In the course of about two hours, fifty specimens, mostly females, were taken on the Goldenrod flowers (*Solidago*). No specimens were taken elsewhere.

THECLA MOPSUS, Hübner.

Thecla Mopsus, HARRIS, Insects Injurious to Vegetation.

A few specimens were taken at Apex Gulch with *T. Sæpium*, and others were obtained toward the last of August at Bailey's ranch, on the South Park road.

THECLA IROIDES, Boisd.

Thecla Iroides, MORRIS, Syn. Am. Lep., 100.

The Colorado specimens of this species differ a little from the usual Californian types. In the male, the stigma upon primaries is longer and more sharply pointed.

Both sexes have scarcely any lobe at the anal angle of secondaries. The under surface is usually suffused with vinous; and the anal third of secondaries is densely powdered with gray scales. The fringe is dark-brown, except between the nervures, where its inner half is gray.

The species may be found toward the last of May and early in June among the foot hills of the Rocky Mountains, at above 7,000 feet elevation, usually flying by the road side or alighting upon damp spots.

THECLA ERYPHON, Boisd.

Thecla Eryphon, MORRIS, Syn. Am. Lep., 100.

A few specimens were taken early in June in Colorado, associated with *T. Iroides*.

CHRYSOPHANUS, Hübner.

CHRYSOPHANUS HELLOIDES, Boisd.

Polyommatus Helloides, MORRIS, Syn. Am. Lep., 86.

This species was brought by the expedition from Southern Utah. It is moderately abundant in all parts of Colorado; being found on the plains as well as near the summits of the highest peaks, and may be found from the first of June to the last of August.

In the South Park, and also near Turkey Creek Junction, a number of caterpillars were found, probably of this species. When full grown, they measured three-fourths of an inch in length. In shape, they were onisciform. The head is brownish, entirely retractile within the first segment. Body grass-green, covered with a slight reddish down. Young larva with a reddish-brown dorsal stripe. It feeds upon the Yellow Dock (*Rumex*). Those taken in the South Park were hidden on the surface of the ground under leaves or sticks, but the others were on plants growing in cultivated ground. During the day, these latter buried themselves to a depth of from one to two inches in the loose soil at the base of the plant; always, however, remaining

on the stem. Several changed to chrysalis, which is pale-greenish, finely mottled with dark-brown, but all died before completing their transformations. The larvæ are full grown by the last of June.

CHRYSOPHANUS CASTRO, Reakirt.

Polyommatus Castro, REAKIRT, Proc. Ent. Soc. Phila., 1867.

Whether this species is *Helloides* or not is difficult to determine; the only notable discrepancy in the descriptions is that *Castro* is said to have a "long discal bar" on secondaries, while in *Helloides* this is no longer than the discal spot of primaries. Dr. Boisduval, however, gives a description of *C. Nivalis*, which has been considered a synonym of *Castro*, and says that although allied to *Helloides*, it is "very distinct".

†CHRYSOPHANUS IANTHE, Edw.

Chrysophanus Ianthe, EDW., Trans. Am. Ent. Soc., 1871.

Specimens were brought by the expedition from Southern Utah; the original types were from Virginia City, Nev.; and these two are the only localities from which the species is recorded.

CHRYSOPHANUS SIRIUS, Edw.

Chrysophanus Sirius, EDW., Trans. Am. Ent. Soc., 1871.

This species was first discovered at Twin Lakes, July 12. On the 13th, forty males and two females were taken at a grassy spot near the head of the upper lake, in company with *Lycæna Heteronea*, the females of which closely resemble some varieties of *C. Sirius* ♀ both above and below. *C. Sirius* was also taken near Mount Lincoln, and at various points in the South and Middle Parks, but was quite rare except in the immediate vicinity of Twin Lakes.

LYCÆNA, (Fabr.) Oken.

LYCÆNA HETERONEA, Boisd.

Lycæna Heteronea, MORRIS, Syn. Am. Lep., 89.

The expedition brought specimens of *L. Heteronea* from Southern Utah. In Colorado, the first individuals were seen June 23 on Turkey Creek; but it was much more abundant at Twin Lakes early in July. Altogether fifty-nine specimens were taken. It occurs also in California.

LYCÆNA BATTOIDES, Boisd.

Lycæna Battoides, BOISD., Lépidoptères de la Californie, 1869.

This species is very similar to *Glaucon*, Edw., but is much darker, and more heavily marked beneath. A few specimens were taken in Colorado, nearly all on the headwaters of the Platte River, at moderate elevations. The species should be looked for in June and July.

LYCÆNA GLAUCON, Edw.

Lycæna Glaucon, EDW., Trans. Am. Ent. Soc., 1871.

Two or three specimens, apparently referable to this species, were taken on the South Park road in the latter part of June. It is also found in Nevada.

LYCÆNA ACMON, Hewitson & Westwood.

Lycæna Acmon, MORRIS, Syn. Am. Lep., 87.

This is an abundant species in Colorado, occurring at nearly all elevations from May to the 1st of September; and near the Yosemite Valley, California, I have taken specimens as late as the middle of October. The females of *L. Acmon* are usually brown, but occasionally varieties are found having the whole surface covered with blue scales, except a rather broad, marginal band of brown, which, on the secondaries, contains the orange streak. Between these extremes all intermediate variations may be found. *L. Acmon* was brought by the expedition also from Southern Utah.

LYCÆNA CALCHAS, Behr.

Lycæna Calchas, BEHR, Proc. Cal. Acad. Nat. Sci.

A single specimen was taken August 5, on Gray's Peak, at an elevation of 12,000 feet. One other was seen on a mountain near Twin Lakes at a similar elevation. The original types were found in the Sierra Nevada of California at high elevations.

†LYCÆNA ANNA, Edw.

Lycæna Anna, EDW., Proc. Acad. Nat. Sci. Phila., 1862.
Lycæna Cajona, REAKIRT, Proc. Ent. Soc. Phila., 1867.

I have no knowledge of specimens of this species from Colorado. It is probably not found east of Nevada. Until recently, it has been confounded with the following species.

LYCÆNA MELISSA, Edw.

PLATE XXXVI, FIGS. 5, 6, 7, 8.

Lycæna Melissa, EDW., Trans. Am. Ent. Soc., 1873.

This is a not very uncommon species near Denver in May or June. In the South Park and about Twin Lakes, it is abundant by the first week in July. Specimens were brought in by the expedition of 1871, probably from the vicinity of Fairplay. This is a much more heavily marked species than *Anna*, and the ground color below is gray instead of white.

LYCÆNA COMYNTAS, Godart.

Lycæna Comyntas, HARRIS, Insects Injurious to Vegetation.

This species is found occasionally in Colorado, and I have taken a single specimen in California, near Sacramento, October 6. In California, *L. Comyntas* is largely replaced by *Amyntula*, Boisd., which I believe to be distinct. *Amyntula* may be distinguished by the more delicate marking below. It is slightly larger, and the ground color of the under side is of a paler gray, often with a bluish tinge toward the base of the wings.

LYCÆNA ISOLA, Reakirt.

Lycæna Isola, REAKIRT, Proc. Acad. Nat. Sci. Phila., 1866.
Lycæna Alce, EDW., Trans. Am. Ent. Soc., 1871.

A few specimens were taken on Turkey Creek late in June, and near Georgetown about the middle of August. The latter specimens were much worn and faded. *L. Isola* has been sent to me from Eastern Nebraska by Mr. George M. Dodge, and is of common occurrence in Texas.

LYCÆNA RUSTICA, Edw.

Lycæna Rustica, EDW., Proc. Ent. Soc. Phila., 1864.

L. Rustica frequents sunny places in the open pine forests, where it may be seen on flowers of *Compositæ*, in company with *Melitæa Nubigena* and many *E. Claudia*. The species appears early in June, is quite abundant at from 7,000 to 10,000 feet elevation, and remains on the wing until the last of August. Seventy-five specimens were taken during the season; they presented no very noticeable variations.

LYCÆNA RAPAHOE, Reakirt.

Lycæna Rapahoe, REAKIRT, Proc. Ent. Soc. Phila., 1867.

My specimens of *L. Sæpiolus*, Boisd., from Colorado, are somewhat darker on the under surface than Californian examples, but whether they are referable to *L. Rapahoe* could only be determined by reference to the type specimens.

LYCÆNA SÆPIOLUS, Boisd.

Lycæna Sæpiolus, MORRIS, Syn. Am. Lep., 88.

This is altogether the most abundant *Lycæna* of Colorado. It was brought by the expedition from the South Park, and seems to occur at all elevations below timber line.

A larva was found on Turkey Creek, which may be of this species. It was slug-shaped; body flesh color, obliquely striped with crimson. It fed upon *Sedum*. Unfortunately, the specimen was lost before it had completed its transformation, so its precise species is doubtful.

Of *L. Sæpiolus*, one hundred and twenty-four specimens were taken in June and July. The species is found in damp places rather than at flowers, often with *L. Lygdamas* and *Argynnis Epithore*.

LYCÆNA RUFESCENS, Boisd.

Lycæna Rufescens, BOISD., Lépidoptères de la Californie, 1869.

Two or three females were taken in company with *L. Sæpiolus*. They are distinguished by the plain fulvous color above, and deep brown under surface. I believe, however, that this will prove to be a female variety of the preceding species.

LYCÆNA LYGDAMAS, Doubleday.

Lycæna Lygdamas, EDW., Butterflies N. A., i.

This *Lycæna* is not uncommon in the mountains. The expedition brought specimens from the South Park. The species disappears by the last of June. In a female specimen in my collection, three of the dark spots on the under surface of each wing are reproduced above.

LYCÆNA ANTIACIS, Boisd.

Lycæna Antiacis, MORRIS, Syn. Am. Lep., 90.

A single female taken June 15 near the South Park seems to be of this

species. The shade of blue above is quite different from that of *Lygdamas*, and more inclined to purple.

LYCÆNA LYCEA, Edw.

Lycæna Lycea, EDW., Proc. Ent. Soc. Phila., 1864.

This species is especially abundant on the outskirts of Denver early in June. They are usually found among wild Blue Lupines, which there are common weeds, and very possibly the larva may feed upon this plant. Later in the season, in the South Park an empty egg and a caterpillar, both evidently of some *Lycæna*, were found on wild lupines. The larva was pale green, with one or two whitish dorsal stripes, but was lost before I had an opportunity to make a detailed description. *L. Lycea* is a very variable species; the black dots on the under surface are often encroached upon by their white margins to such an extent that only minute points remain. The species remains on the wing till August. About seventy specimens were taken. It was brought from the South Park by the expedition, but is not known to occur outside of Colorado.

† LYCÆNA PHERES, Boisd.

Lycæna Pheres, MORRIS, Syn. Am. Lep., 88.

Specimens of this species were brought by the expedition from Southern Utah; it occurs also in Nevada and California.

LYCÆNA DAUNIA, Edw.

Lycæna Daunia, EDW., Trans. Am. Ent. Soc., 1871.

Three specimens of this species, the only known examples, were taken on Turkey Creek during the last week in June.

LYCÆNA PSEUDARGIOLUS var. VIOLACEA, Edw.

Lycæna violacea, EDW., Butterflies N. A., i.

One specimen was taken, either near Denver or on Turkey Creek, early in June.

† LYCÆNA PIASUS, Boisd.

Lycæna Echo, EDW., Proc. Ent. Soc. Phila., 1864.

L. Piasus was collected by the expedition of 1871. Though not rare in California, it is not known to occur as far east as Colorado.

LYCÆNA NEGLECTA, Edw.

Lycæna Neglecta, EDW., Butterflies N. A., i.

This species occurs rarely in Colorado. One or two specimens were taken in June.

LEMONIAS, (Illiger) Westwood.

†LEMONIAS DUMETI, Behr.

Lemonias Dumeti, BEHR, Proc. Cal. Acad. Nat. Sci., 1865.

This species was taken by the expedition of 1871, probably in Utah or Arizona. It inhabits the extreme southwest of the United States.

†LEMONIAS CYTHERA, Edw.

PLATE XXXVI, FIGS. 3, 4.

Lemonias Cythera, EDW., Proc. Am. Ent. Soc., 1873.

Three males were collected by the expedition in Arizona. They are the only known examples

EPARGYREUS, (Hübner) Scud.

EPARGYREUS TITYRUS, Fabr.

Epargyreus Tityrus, HARRIS, Insects Injurious to Vegetation, pl. v.

I did not meet with this species in Colorado; but my brother, S. H. Mead, jr., gave me three specimens, which he took in the mountains near the South Park. They did not differ from eastern examples.

NISONIADES, Hübner.

NISONIADES PERSIUS, Scud.

Nisoniades Persius, SCUD., Proc. Essex Inst., 1862.

N. Persius is the most common species of its genus in Colorado. About twenty-five specimens were obtained. They differ somewhat from eastern individuals; but Mr. Scudder informs me that in Arizona still more aberrant forms are found, all of which, however, seem too near *Persius* to be separated specifically.

NISONIADES PETRONIUS, Scud.

Nisoniades Petronius, SCUD., MS.

Mr. Scudder writes, in a recent letter, that he has received from Mr. Edwards an undescribed Colorado *Erynnis* (*Nisoniades*), and will give it this name.

NISONIADES RUTILIUS, Scud.

Nisoniades Rutilius, SCUD., MS.

One individual, now in Mr. Scudder's hands for description, was taken June 23 at Turkey Creek Junction.

NISONIADES ICELUS, Lintner.

Nisoniades Icelus, LINTNER, 23d Rep. N. Y. State Illus. Nat. Hist., 1872.

One specimen was taken June 10 near Fairplay, South Park.

PHOLISORA, Scud.

PHOLISORA CATULLUS, Cramer.

Nisoniades Catullus, MORRIS, Syn. Am. Lep., 115.

Specimens were brought by the expedition from Southern Utah. One or two were seen near Denver early in June.

LEUCOSCIRTES, Scud.

†LEUCOSCIRTES ERICETORUM, Boisd.

Syriehthus Alba, EDW., Proc. Ent. Soc. Phila., 1866.

Brought in by the expedition of 1871, probably from Utah or Arizona. The species is also found in California.

HESPERIA, (Fabr.) Kirby.

HESPERIA TESSELLATA, Scud.

Hesperia Tessellata, SCUD., Rep. Peabody Acad. Sci., 1871.

This species is abundant throughout the West. In Colorado, it is found on the wing during June and July.

HESPERIA, *sp.* (?).

A *Hesperia*, very closely allied to *Centaureæ*, Rambur, frequents the high peaks about Twin Lakes, where seventeen specimens were taken in July, all above 11,000 feet elevation (timber line).

Mr. Scudder assures me that this species is distinct from *Ruralis*, Boisd., to which it was at first referred. It is probably not *Centaureæ;* but I have scarcely sufficient material for comparison at hand to safely describe it as distinct.

OARISMA, Scud.

OARISMA GARITÁ, Reakirt.

Hesperia Garitá, REAKIRT, Proc. Ent. Soc. Phila., 1867.
T. Hylax, EDW., Trans. Am. Ent. Soc., 1871.

This is a rather rare species, and so far has not been taken outside of Colorado. A closely allied species, undescribed, unless a variety of *O. Powesheik*, is, however, found in the Yellowstone region of Montana. *O. Garitá* was collected by the expedition in the South Park. It occurs also at Twin Lakes, and may be found during June and a part of July.

POTANTHUS, Scud.

POTANTHUS OMAHA, Edw.

Hesperia Omaha, EDW., Proc. Ent. Soc., Phila., 1863.

Habitat: "Pike's Peak, Colorado; Kanawha County, West Virginia" (Edwards).

I do not know this species.

AMBLYSCIRTES, Scud.

AMBLYSCIRTES KIOWAH, Reakirt.

Habitat: "Rocky Mountains." With this species, I am also unacquainted.

OCYTES, Scud.

OCYTES RIDINGSII, Reakirt.

The male of this species appears to be undescribed. It is very similar to the female, and differs chiefly in being of a brighter fulvous above, and in the possession of the black, velvety, discal bar, or stigma, on the primaries; this shows beneath as a blackish line. The species was found at Twin Lakes in July, generally upon or near the Dwarf Lupines, which grew with bunch grass and low herbage, in open spaces between the plants of sage brush.

Altogether thirty-one specimens were taken.

PAMPHILA, (Fabr.) Westwood.

PAMPHILA NAPA, Edw.

Hesperia Napa, EDW., Proc. Ent. Soc. Phila., 1864.

Brought by the expedition from Colorado. I found a few specimens in August near Georgetown, Colo., and two in the Yosemite Valley on the 21st of October.

†PAMPHILA JUBA, Scud.

Pamphila Juba, SCUD., Rep. Peabody Acad. Sci., 1871.

I do not know this species from Colorado, though very probably it may be found there. All my specimens were taken near Salt Lake City, Utah, early in October. There it seems to be not uncommon.

PAMPHILA COLORADO, Scud.

Pamphila Colorado, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

This species, with the following, appears late in the season. Specimens were taken on the Georgetown and South Park roads during the latter part of August.

PAMPHILA MANITOBA, Scud.

Pamphila Manitoba, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

Of this species I have two males, taken August 19 and 30; one at Idaho Springs, the other on the South Park road.

PAMPHILA NEVADA, Scud.

Pamphila Nevada, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

This is a smaller species than either of the two preceding. It is quite common, in June, in the mountains about the South Park, and in the park itself. It does not seem to appear later than July.

ATALOPEDES, Scud.

†ATALOPEDES HURON, Edw.

Hesperia Huron, EDW., Proc. Ent. Soc. Phila., 1863, pl. i.

This species was brought in by the expedition of 1871, but the precise locality is not given. It occurs from New York to Texas.

POLITES, Scud.

POLITES DRACO, Edw.

Pamphila Draco, EDW., Trans. Am. Ent. Soc., 1871.

P. Draco was moderately abundant in the mountains during June and the early part of July. Specimens were brought by the expedition from Southern Utah, and from Twin Lakes, Colorado. It is also found in California.

OCHLODES, Scud.

OCHLODES SONORA, Scud.

Ochlodes Sonora, SCUD., Rep. Peabody Acad. Sci., 1871.

Individuals of this species, from Colorado, seem a little darker in color than those from California. Several specimens, all males, were obtained at Twin Lakes about the middle of July.

LIMOCHORES, Scud.

LIMOCHORES CERNES, Boisd. & LeC.

H. Ahaton, HARRIS, Insects Injurious to Vegetation.

One male and one female of this species were taken in Colorado. They differ somewhat from the ordinary eastern type in that the wings are much suffused with fulvous.

NOCTUIDÆ—CATOCALA, Schrank.

CATOCALA EDITHA, Edw.

Catocala Editha, EDW., Trans. Am. Ent. Soc. Phila., Oct., 1874, 112.

Male.—Expands 3.3 inches. Primaries light gray-brown, crossed longitudinally from base to a point just below apex by a blackish-brown stripe; the transverse lines distinct; the basal nearly entire from the costa to middle of submedian interspace, and there serrated in the form of the letter W, the middle serration being very small; the elbowed line has two prominent teeth, the upper one projecting about one-tenth inch; following these a deep obovate sinus that reaches nearly to the basal line; on the lower edge of this sinus the line is twice serrated, and then forms a re-entering angle to submedian nervure; a wavy, gray, serrated stripe crosses the extradiscal area, anteriorly following the course of the elbowed line, but posteriorly

nearly parallel to the hind margin; within the margin a series of brown points in the several interspaces, each on a gray streak coming from the margin, reniform, bright brown, edged on the basal side with black. Secondaries bright rosy-red; the median band rather broad, contracted on the middle on the outer side, even edged, and with a circular curve on the inner side, terminating in a blunt point a little within the abdominal margin; the marginal border broad, and somewhat sinuous within posteriorly; the margin narrowly edged with yellow-white, with fringes of same color.

On the under side, the red shade covers rather more than one-third of the wing, but is partly wanting on the submedian interspace outside of the median band.

From a single specimen taken in Sonoita Valley by H. W. Henshaw, July, 1874.

NOTE.—The plates to illustrate this report have been in some instances copied from those of Mr. W. H. Edwards in his recent work, Butterflies of North America, by permission; others have been figured from nature.

List of species of Lepidoptera collected in 1871, 1872, 1873, *and* 1874 *in California, Nevada, Utah, Colorado, New Mexico, and Arizona, identified by*

WILLIAM H. EDWARDS.

RHOPALOCERA.

PAPILIO, Fabr.

P. Pilumnus, Boisd.
Zolicaon, Boisd.
Daunus, Boisd.
Rutulus, Boisd.
Asterias, Drury.

P. Turnus, Linn.
Bairdii, Edw.
Americus, Kohl.
Philenor, Linn.

PARNASSIUS, Latr.

P. Clodius, Ménétriés.

P. Smintheus, Doubleday.

PIERIS, Boisd.

P. Protodice, Boisd.
Occidentalis, Reakirt.

P. Menapia, Felder.
Beckerii, Edw.

ANTHOCHARIS, Boisd.

A. Julia, Edw. | A. Ausonoides, Boisd.

NATHALIS, Boisd.

N. Iolé, Boisd.

COLIAS, Fabr.

C. Cæsonia, Stoll. | C. Alexandra, Edw.
Eurydice, Boisd. | Scudderii, Reakirt.
Eurytheme, Boisd. | Edwardsii, Behr.
Keewaydin, Edw. | Meadii, Edw.

TERIAS, Swains.

T. Nicippe, Cramer. | T. Mexicana, Boisd.

DANAIS, Latr.

D. Archippus, Cram. | D. Berenice, Cram.

EUPTOIETA, Doubleday.

E. Claudia, Cram.

ARGYNNIS, Fabr.

A. Nokomis, Edw. | A. Nevadensis, Edw.
Nitocris, Edw. | Eurynome, Edw.
Nausicaa, Edw.

MELITÆA, Fabr.

M. Anicia, Doub. | M. Nubigena, Behr.
Palla, Boisd. | Leanira, Felder.
Hoffmanni, Behr. | Canace, Edw.
Acastus, Edw. | Minuta, Edw.

PHYCIODES, Doub.

P. Mylitta, Edw. | P. Pallida, Edw.
Camillus, Edw. | Marcia, Edw.

SYNCHLOE, Doub.

S. Crocale, Edw.

GRAPTA, Kirby.

G. Zephyrus, Edw.

VANESSA, Fabr.

V. Antiopa, Linn.

PYRAMEIS, Doub.

P. Huntera, Drury. | P. Carye, Hüb.
Cardui, Linn. | Atalanta, Linn.

JUNONIA, Doub.

J. Lavinia, Hüb.

LIMENITIS, Fabr.

L. Weidemeyerii, Edw.
Ursula, Fabr.

L. Lorquini, Boisd.
Californica, Butler.

APATURA, Fabr.

A. Leilia, Edw.

LIBYTHEA, Fabr.

L. Carinenta, Cram.

GYROCHEILUS, Butler.

G. Tritonia, Edw.

CŒNONYMPHA, Westwood.

C. Ochracea, Edw.

SATYRUS, Westwood.

S. Wheeleri, Edw.
Ariane, Boisd.
Ridingsii, Edw.

S. Silvestris, Edw.
Charon, Edw.

EREBIA, Dalman.

E. Epipsodea, But.

CHIONOBAS, Boisd.

C. Chryxus, Doub.
Semidea, Harris.

C. Uhlerii, Reak.

THECLA, Fabr.

T. Halesus, Cram.
Crysalus, Edw.
Humuli, Harr.
Sylvinus, Boisd.

T. Mopsus, Hüb.
Siva, Edw.
Californica, Edw.

CHRYSOPHANUS, West.

C. Helloides, Boisd.

C. Ianthe, Edw.

LYCÆNA, Fabr.

L. Piasus, Boisd.
Pheres, Boisd.
Battoides, Boisd.
Sæpiolus, Boisd.
Heteronea, Boisd.
Amyntula, Boisd.

L. Lycea, Edw.
Fea, Edw.
Melissa, Edw.
Helios, Edw.
Acmon, Doub.
Isola, Reak.

LEMONIAS, Westwood.

L. Dumeti, Behr.

L. Cythera, Edw.

PYRRHOPYGE, West.

P. Araxes, Hewitson.

EUDAMUS, Swains.

E. Cellus, Boisd.

NISONIADES, West.

N. Funeralis, Scud.
Persius, Scud.

N. Catullus, Cram.

SYRICHTUS, Boisd.

S. Tessellata, Scud.
Scriptura, Boisd.

S. Oceanus, Edw.

PAMPHILA, Fabr.

P. Huron, Edw.
Napa, Edw.
Draco, Edw.

P. Colorado, Scud.
Nevada, Scud.
Nereus, Edw

ANCYLOXYPHA, Felder.

A. Hylax, Edw.

HETEROCERA.

MEGATHYMUS, Scudder.

M. Yuccæ, Boisd.

DEILEPHILA, Ochsenheimer.

D. Lineata, Fabr.

SPHINX, Linn.

S. Carolina, Linn.

EUCHRONIA, Packard.

E. Maia, Drury.

ATTACUS, Linn.

A. Cecropia, Linn.

CATOCALA, Schrank.

C. Editha, Edw.

C. Faustina, Strecker.

FIG. 1 and 2. ARGYNNIS NOKOMIS. ♂
FIG. 3 and 4. ARGYNNIS NOKOMIS. ♀

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FIG 1-2. MELITÆA MINUTA. ♂ FIG. 3-4. LEMONIAS CYTHERA ♂
FIG. 5-6. LYCÆNA MELISSA. ♂ FIG. 7-8. LYCÆNA MELISSA ♀

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FIG. 1–2. SYNCHLOE CROCALE♂ FIG. 3–4 SYNCHLOE CROCALE ♀
FIG. 5–6. MELITÆA LEANIRA♂ FIG. 7–8. MELITÆA LEANIRA ♀

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FIG. 1-2. LIMENITIS WEIDEMEYERII ♂
FIG. 3-4. LIMENITIS CALIFORNICA ♂
FIG. 5-6. LIMENITIS LORQUINI. ♂

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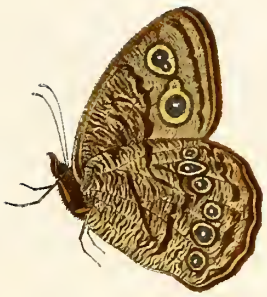

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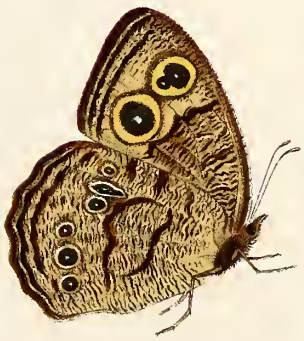

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FIG. 1-2. SATYRUS WHEELERI. ♂
FIG. 3-4. SATYRUS WHEELERI. ♀

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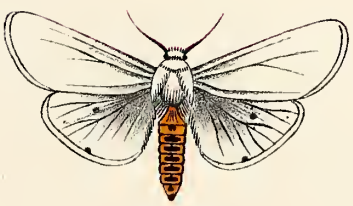

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FIG. 1-2. ARCTIA YARROWII. FIG. 2a. 3. ARCTIA DOCTA VAR. ARIZONENSIS.
FIG. 4-5. LEUCARCTIA ALBIDA. FIG. 5a. 6. EUCHÆTES ELEGANS.

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CHAPTER IX.

REPORT

UPON

NEW SPECIES OF ZYGAENIDAE AND BOMBYCIDAE

COLLECTED IN PORTIONS OF

CALIFORNIA AND ARIZONA

DURING

THE YEARS 1871, 1872, AND 1873.

BY

RICHARD H. STRETCH.

CHAPTER IX.

This collection, though small, is of much interest, as indicating what we may expect from Arizona when more is known of its fauna. Two of the species here enumerated range into Costa Rica and three into Mexico; two of them as far north as Portland in Oregon, and only one seems to be peculiar to Arizona. This linking of the United States to the tropical fauna of Central America and Mexico may largely swell the list of United States species. Nor should it be lost sight of that while the Mexican forms range into Arizona, the Gulf of California appears to have proved a barrier to their distribution in California. A number of specimens still remain to be identified in this collection.

BOMBYCIDAE.

ARCTIINAE.

EUCHAETES, Harris.

EUCHAETES ELEGANS, *sp. nov.*

PLATE XL, FIGS. 5, 6.

♂.—White. Head and palpi white, the latter rosy at the base, and the former very narrowly rosy behind, particularly near the eyes. Antennæ white; pectinations black. Prothorax, patagia, and thorax white. Abdomen *rosy* above; dusky white beneath, with a faint dorsal row of whitish spots, centered with dusky, and a lateral row of black spots. Legs whitish, with the coxæ of the anterior pair pale rosy. Wings pure glossy white, immaculate.

♀.—Similar to ♂, except that the colors of the abdomen are less distinct, and the last segment of the abdomen is tufted with dense whitish hairs, somewhat as in *E. egle* ♀.

Expanse of wings, ♂ ♀, 1.45 inches. Length of body, 0.55 inch.

Hab.—Owen's Valley, California. Described from one ♂ and ♀ in good preservation. In the form of the wings and general structure of the body, this species closely resembles *E. egle* and *E. oregonensis*, but the wings are narrower than in *E. collaris*. The color of the abdomen separates it readily from its allies found in the United States, though there is a very similar Mexican species with a rosy head.

Habits unknown.

COCHLIDIINAE.

LEUCARCTIA, Packard.

LEUCARCTIA ALBIDA, Stretch.

Plate XL, Figs. 4, 5.

♂.—White. Head and thorax white. Sides of the front next the eyes black. Palpi black, a little whitish below. Thorax beneath white. Antennæ black. Abdomen clear yellow-ocher above, except the apical segment and the basal hairs, which are white; beneath white. Each segment above has a transverse black spot. There is a lateral row of small black dots, and a faint indication of a sublateral row of the same color. Legs white above. Coxæ of anterior pair black, fringed with yellow hairs. Inside of femora yellow; those of the middle pair only partially so; those of the posterior pair only at the apex of the joints; tips all touched with black. Tibiæ of anterior and middle pairs streaked with dusky inwardly; posterior pair white. Tarsi dusky beneath. Wings pure white, both above and beneath; the anterior pair immaculate; secondaries showing faint traces of a discal spot and two submarginal spots. Expanse of wings, 1.20 inches. Length of body, 0.80 inch.

Hab.—Owen's Valley, California.

♀.—Unknown.

The specimen from which the description is given is in poor preserva-

tion, but may readily be distinguished from *L. acræa*, not merely by its smaller size and the absence of markings, which alone in such genera as this would scarcely warrant its separation under a specific name, but by the color of the posterior wings, which are totally different from the well known *L. acræa*. It may not be uninteresting to add that I have in my collection a ♂ exactly corresponding to the foregoing description, which I received from Costa Rica through Dr. Van Patten. This gentleman's collection was made in the table lands of the interior. I have also, from the same locality, a large *notodontid* (?), likewise identical with a specimen received from Arizona! When it is remembered that I am as yet acquainted with only five species of *Bombycina* from the district of Arizona and its vicinity, it is somewhat remarkable that two of these should be represented in a locality so widely removed as Costa Rica, and we may naturally look for many striking additions to our list of insects as we become more familiar with this as yet almost unknown country.

ZYGAENIDAE.

CASTNIINAE.

ARCTIA, Schrank.

ARCTIA DOCTA var. ARIZONIENSIS, Stretch.

PLATE XL, FIGS. 2, 3.

♂.—Head yellow-ocher; palpi black; antennæ brown; prothorax, patagia, and thorax somewhat hairy, pale whitish-yellow; the patagia each with a black dash and the thorax with a central black line.

Abdomen above pale vermilion; terminal segments black, beneath black, with a broad ventral pale yellowish stripe. Legs blackish; coxæ of anterior pair hairy, ocher yellow.

Anterior wings pale creamy-yellow, with the following reduced black spots: two basal streaks; three irregularly shaped angular subcostal spots, one of which is on the discal vein, one outside and one inside of the discal vein; two spots on the outer margin, one apical the other on the second meridian; a submarginal spot between the third and fourth median nervules; an elongated anal spot and a minute transverse spot on the submedian vein,

near the base. The middle subcostal spot is supplemented below the median vein by a very faint transverse streak. Fringes concolorous with wings.

Secondaries dirty white, thinly scaled, rosy along the inner margin, with a small blackish discal spot; a submarginal row of three blackish spots, the anal one small, the apical one extending from the costa to the first median nervule. There are also two marginal spots, one near the apex, the other about the middle of the inner margin.

Beneath as above, except that the fore wings are nearly white, and the costa of all the wings is decidedly yellow-ocher.

Expanse of wings, 1.60 inches. Length of body, 0.65 inch.

Hab.—Arizona.

Described from one ♂ received from my friend Mr. W. H. Edwards. The nearest ally of this beautiful species is *A. autholea*, Boisduval, which it much resembles. The number and location of the black markings in the primaries is identical, but they are much reduced in size. The chief point of difference is in the black markings on the secondaries, of which there is no trace in *A. autholea* ♂ , while it may prove, however, to be merely a variety when we possess larger *suites* of these insects. It is at present sufficiently distinct to warrant a separate name.

ARCTIA YARROWII, Stretch.

Plate XL, Figs. 1, 2.

♂.—Head clothed with long black hairs. Thorax black, lemon-yellow outwardly. Abdomen black both above and beneath, densely and finely scaled, with an indistinct lateral row of crimson dots. Anal tuft silky, pale ferruginous. Legs black; anterior pair with crimson coxæ; in the middle pair the tips of the tibiæ and the femora are likewise crimson; on the hind pair the tips of the tibiæ and ends of the tarsi are also of the same color.

(*Note.*—The specimen from which this description is drawn has been pressed as flat as a botanical specimen, and the body parts do not admit of a more detailed description. The antennæ are wanting.)

Anterior wings velvety black, with very narrow fringes and markings as follows of clear lemon-yellow: five angular costal spots, of which the two nearest the base are quadrate; the third at the middle of the wing is

much narrower; all of these extend only to the median vein; the fourth is narrow, though wider than the third, and extends across the wing to the anal angle as an irregular band, being toothed outwardly about the middle at the point where it receives the termination of the fifth short irregular spot or band; below the submedian vein, near the base of the wing and opposite the costal spots 1 and 2, are two small, very reduced spots; and from the middle of the inner margin springs a very narrow, curved band, which unites with the middle of the fourth spot, forming with it and the fifth the usual terminal Arctian markings. The disposition of these markings is more like that of *E. caja* or *N. plantaginis* than any of the strictly American Arctians.

Posterior wings full, rounded, rather thinly scaled; basal half black, bounded outwardly by an irregular line extending from the basal two-fifths of the costa to the anal angle. Outer half orange-scarlet, inclining to orange near the apex. Fringes lemon-yellow. This outer half contains a small black spot on the discal vein, and a submarginal row of three larger black spots. The first of these lies across the interspace above the first median nervule; the second across, the fourth median nervule; and the third, on the submedian vein close to the outer margin. There is besides a very narrow marginal spot about the middle of the outer margin.

Beneath, the markings are reproduced; those on the primaries, especially near the apex, being broader and more diffuse. All the light portion of the primaries, except near the apex, are suffused with crimson; this color being most intense near the base and along the subcostal vein. The secondaries are somewhat paler, and there is a crimson streak on the basal third of the costa, which does not appear above. Expanse of wings, 1.75 inches. Length of body, 0.80 inch.

Hab.—Arizona.

♀.—Unknown.

This species, without exception the most beautiful of the American Arctians, cannot be mistaken for any other. It belongs to the section in which the veins are not clearly marked with a distinctive color. The body reminds one of *Epicallia virginalis*, Boisduval, the under wings suggest the ♀ variety of *Nemeophila plantaginis* with red secondaries, while the orna-

mentation of the primaries recalls *E. caja*. It is so unlike any of our other species of the genus that further comparison is unnecessary. It is with much pleasure that I dedicate this beautiful insect to Dr. H. C. Yarrow, the surgeon and zoölogist of this expedition, and to whom I am indebted for many kindnesses.

EPICALLIA, Hübner.

EPICALLIA VIRGINALIS, Boisd.

Two specimens were received from Arizona similar to var. *guttata*. but with rather more ochreous spots on the secondaries, and with the yellow spots on the secondaries rather larger in size than in Californian specimens.

MELANCHROIA.

MELANCHROIA? INCONSTANS, Hübner.

Melanchroia? inconstans, WALKER, C. L., B. M., 389.
Ardonia secreta, WALKER, C. L., B. M., 222, supp.

One specimen from Arizona.

ALYPIA, Hübner.

ALYPIA BIMACULATA, H. S.

Agarista Grotei, BOISD., Lep. Cal. (1868–69).

One specimen in good condition from Arizona, with the secondaries immaculate. The type of this species was from Mexico.

GNOPHAELA.

GNOPHAELA HOPFFERI, Grote, var. DISCRETA Stretch.

Var. DISCRETA, *var. nov.*

Two specimens which I have referred to the above species may possibly prove to be specifically distinct, though I prefer at present to consider them merely as a local variety. While resembling *G. Hopfferi* in form, they are nearer to *G. vermiculata*, Grote, in color, particularly on the secondaries. The most prominent difference is in the yellowish spot of the primaries, which lies on the discal area. In *vermiculata*, this is cuneiform, and reaches nearly to the base of the wing; in *Hopfferi*, it is quadrate, and does not extend back of the base of the fourth median nervule; while in *discreta* it is intermediate in form. These specimens were from Arizona, and neither of the previously described forms have yet been received from that Territory.

CHAPTER X.

REPORT

UPON

THE COLLECTION OF DIPTERA

MADE IN PORTIONS OF

COLORADO AND ARIZONA

DURING

THE YEAR 1873.

BY

C. R. OSTEN-SACKEN.

CHAPTER X.

The small number of *Diptera* collected were preserved in alcohol, which renders specimens of this order more or less unfit for scientific purposes.

Furthermore, the specimens of this collection apparently have been transferred from other bottles to those in which they were ultimately examined, because in many cases only fragments of insects were found, while at the same time portions of the specimens which were wanting could not be discovered in the vials received. Under the circumstances, all that can be furnished is a meagre list of the few capable of identification.

The only available specimen in the collection was a fine *Lasia* (family *Acroceridæ*), new to science, the description of which is as follows:

LASIA KLETTII, *nov. sp.*

Metallic green; feet black. Long. corp. 17 millimeters.* Altogether metallic green, with golden reflections; upper side finely and evenly punctured; venter more bluish; feet altogether brownish-black; proboscis black, by one-half longer than the body; antennæ very short, black; the basis of the third joint slightly reddish; this joint is more than twice as long as the two first taken together, gradually tapering toward the tip. Wings distinctly infuscated; tegulæ brownish, bordered with black. The specimen having been preserved in alcohol, its metallic surface is entirely deprived of pubescence; some vestiges on the thorax prove that it was clothed with short pale hairs.

Camp Apache, Ariz., September, 1873. Collected by Francis Klett, to whom this species is dedicated.

OBSERVATION.—I place this species provisionally in the genus *Lasia*, to which it is related. It differs from Wiedemann's figure of *Lasia* in the

* The measurement is taken lengthwise through the body, from end to end, without taking into account its considerable gibbo.ity.

fact that the second longitudinal vein ends in the first and not in the costal vein.

It differs from *Eulonchus* in the eyes being contiguous between the antennæ and the vertex only, and not above and below the antennæ. The abdomen is very broad, and its upper side very convex; it is broad and cut squarely at the basis; broad and blunt at the tip (not tapering, as in *Eulonchus*).

The cuts represent this species, Fig. 1, *L. Klettii* magnified; (the hind tarsi are broken off; the hair line indicate the natural size).

Fig. 2, profile view of the same.

Fig. 3, wing magnified.

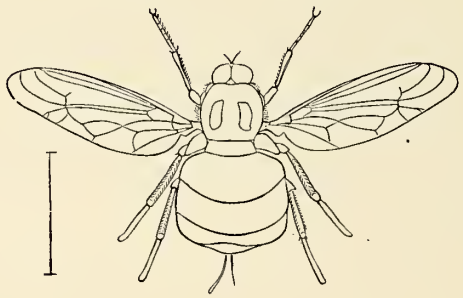

FIG. 1.

FIG. 2.

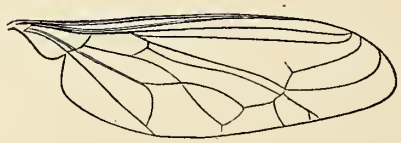

FIG. 3.

LIST OF SPECIMENS IDENTIFIED.

BOMBYLIARII.

ANTHRAX, Linn.

ANTHRAX OEDIPUS, Fabr.

Anthrax œdipus, FABR., Syst. Antl., 123, 22.—WIED., Dipt. Exot., i, 124, 8.—AUSS., Zweifl., i, 262, 12.—SAY, Jour. Acad. Nat. Sci. Phila., iii, 46, 6.—(*Anthrax irrorata*), WALKER, List, &c., ii, 253.

HAB.—Kentucky; Pennsylvania; West Indies; Nova Scotia; Rocky Mountains; Colorado.

A few specimens, collected in 1873 by Dr. J. T. Rothrock at Fairplay, Colo.

ANTHRAX SINUOSA, Wied.

Anthrax sinuosa, WIED., Dipt. Exot., i, 147, 42.—AUSS., Zweifl., i, 301, 64.

HAB.—Georgia; Colorado.

A few badly damaged specimens of this species were taken in 1873 at Twin Lakes, Colorado, by Dr. J. T. Rothrock.

TIPULIDAE.

TIPULA, Linn.

A number of specimens of this genus were collected in South Park, Colorado, and other localities, in 1873, by Dr. J. T. Rothrock, but, having been placed in alcohol, were in too bad condition for identification.

TABANIDAE.

TABANUS, Linn.

Some few specimens, collected in 1873, in San Luis Valley and South Park, Colorado, by Dr. J. T. Rothrock, arrived in fragmentary condition, consequently could not be identified as regards species.

LEPTIDES.

LEPTIS, Fabr.

A few specimens of *Leptis* (*Chrysopila*) were secured in 1873 by Dr. J. T. Rothrock in San Luis Valley, Colorado, but could not be identified.

It is greatly to be regretted that this collection of *Diptera*, consisting of thirty lots, on which great pains had been bestowed, should have been ruined while *en route* to Washington from the field; but under the circumstances the destruction was unavoidable. The collections of preceding years have never been received in Washington.

CHAPTER XI.

REPORT

UPON

THE COLLECTIONS OF COLEOPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874.

BY

HENRY ULKE.

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CHAPTER XI.

The *Coleoptera* which have been collected by this expedition abound in specimens, while the number of species is also very large, no less than 389 having been secured, of which five are new to science. From the peculiar character of that part of the country visited (from Owens Valley, California, to Utah, Colorado, New Mexico, and Arizona), this fact might have been expected, and has already been observed by former collectors. In these desert regions there are two families in particular which are very characteristic, and whose numerous species represent almost exclusively the coleopterous fauna of these localities: they are the *Tenebrionidæ* and *Meloidæ;* the former live on the ground in great numbers and variations, while the latter are found on most every species of *Astragalus*. Of these vesicants, two new forms have been discovered, which, with some other new species, are described below.

DESCRIPTIONS OF NEW SPECIES.

BEMBIDIUM NEVADENSE.

PLATE XLI, FIG. 3.

Greenish-black, shining, subdepressed; upper and under surface brightly shining; thorax subquadrate, a little broader than long; sides rounded, margined, narrower at the base; hind angles rectangular, obliquely carinated, and at the base wrinkled; elytra finely striato-punctate, punctures diminishing toward the apex; interstitial lines depressed; at the humerus and before the apex dark rufous spots; antennæ deep piceous; basal joints rufous; legs dark brown. Length, .20 inch = 5 millimeters. *Nevada.* This species is allied to *B. lucidum, bimaculatum*, etc., but is more blackish, and a little smaller.

DASYTES RUFICOLLIS.

PLATE XLI, FIG. 5.

Body testaceous, shining, and clothed with grayish pubescence; head and thorax reddish-yellow, finely punctured, clothed with cinereous pubescence, the latter rounded and wider than long; elytra dark-bronzed, with the sides and apex reddish-yellow, finely punctured and clothed with cinereous pubescence; abdomen dark-bronzed; prothorax and legs reddish-yellow; antennæ reddish-yellow, with the last five joints dark piceous. Length, 0.9 inch = 2 millimeters. *Nevada.* This species is readily known from all others by its rufous head and thorax.

EPICAUTA WHEELERI.

PLATE LXI, FIG. 4.

Body black, covered with grayish pubescence; thorax rusty-red. Head sparsely punctured and covered with coarse, grayish pubescence; medial line black, shining; thorax rounded, as broad as long, covered with a thick, felt-like, reddish-brown pubescence, edged with lighter-colored, bristle-like hairs; elytra densely clothed with short cinereous pubescence; body beneath black, with coarse, gray pubescence; femora and tibiæ with a black spot at the end; tarsi and antennæ black. Length, 0.35–0.40 inch = 9–11.5 millimeters. *Arizona.* I dedicate this beautiful species with great pleasure to Lieut. George M. Wheeler, Corps of Engineers, U. S. A., who, by the large collections made under his directions, has rendered important services to natural science.

LYTTA LUGUBRIS.

PLATE LXI, FIG. 2.

Uniformly black, moderately shining. Head quadrate, scabrous, with large punctures, and a small, frontal, yellow spot; thorax hexagonal, and sculptured like the head; elytra evenly scabrous; body beneath more shining and uniformly punctured; legs and antennæ dark piceous. Length, 0.45–0.80 inch = 11.5–20 millimeters. *Owens Valley, California.* Resembles *L. childii* and *mœrens*, but may be known at once by the angulated form and coarser sculpture of the head and thorax.

CROSSIDIUS INTERMEDIUS.

PLATE LXI, FIG. 1.

Fulvous, flavo-pubescent. Head and thorax roughly punctured, blackish, thickly covered with yellowish hairs; thorax a little broader than long, with the sides angulated, pointed, and the hind angles prominent; elytra fulvous, densely clothed with flavous pubescence, deeply and closely punctured, the punctures becoming larger toward the base; abdomen flavous; antennæ and legs brown-red. Length, 0.45–0.65 inch = 11–17 millimeters. *Arizona.* This species is closely allied to *C. suturalis*, which differs from it in having the head, thorax, feet, and antennæ black. Some of the females of our species have also a sutural vitta, which extends backward from the anterior third of the elytra, forming a very elongate oval spot like the one in *suturalis*.

LIST OF SPECIMENS.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	CICINDELIDÆ.				
(?)	Tetracha carolina, Linn	Arizona	1871	F. Bischoff	Colorado, New Mexico, and Arizona.
(?)	Cicindela purpurea, Oliv	Nevada	1871	do	Do.
(?)	Cicindela guttifera, Lec	Arizona	1871	do	Do.
(?)	Cicindela pusilla, Say	California and Nevada	1871	do	Do.
(?)	Cicindela hemorrhagica, Lec.	do	1871	do	Do.
D D	Cicindela prasina, Lec	Mineral Springs, Ariz	1873	F. Klett	Do.
4	Cicindela pulchra, Say	Camp Apache, Ariz	1873	H. W. Henshaw	Do.
A	Cicindela pulchra, Say	do	1873	G. M. Keasbey	Do.
D D	Cicindela pulchra, Say	Mineral Springs, Ariz	1873	F. Klett	Do.
79	Cicindela pulchra, Say	South Park, Colo	1873	Dr. J. T. Rothrock	Do.
379 G	do	Colorado, New Mexico, and Arizona.	1874	Lieut. S. Blunt	Do.
1330	Cicindela hirticollis, Say	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
1225	Cicindela punctulata, Fabr	Camp Bowie, Ariz	1874	J. M. Rutter	Do.
160 A	Cicindela micans, var. of punctulata, Fabr.	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
	CARABIDÆ.				
(?)	Elaphrus californicus, Mann.	California	1871	F. Bischoff	Eastern, Western, Pacific States.
104	do	South Park, Colo	1873	Dr. J. T. Rothrock	Do.
	Calosoma triste, Lec	Camp Apache, Ariz	1873	H. W. Henshaw	Colorado and New Mexico.
(?)	Calosoma cancellatum, Esch.	California	1871	F. Bischoff	
(?)	Calosoma luxatum, Say	California and Nevada	1871	do	
1293	Calosoma carbonatum, Lec	Near Camp Crittenden, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
104	Calosoma obsoletum, Say	South Park, Colo	1873	Dr. J. T. Rothrock	Nebraska, Dakota, Kansas, Colorado.
180	Calosoma calidum, Fabr	Plains south of Denver, Colo.	1873	do	Northern, Southern, Eastern, Western States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	CARABIDÆ.				
(?)	Carabus agassii, Lec	Nevada	1871	F. Bischoff	Western States.
29	do	Southern Arizona	1873	H. W. Henshaw	Do.
L 62	do	Rio Grande	1874	Dr. O. Loew	Do.
666	Carabus serratus, Say	Denver, Colo	1873	H. W. Henshaw	Northern, Eastern, Southern, Middle States.
184	Carabus tædatus, Fabr	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	Western States to Alaska.
180	do	Plains S. of Denver, Colo	1873	do	Do.
(?)	Brachinus fidelis, Lec	California	1871	F. Bischoff	
(?)	Brachinus kansanus, Lec	Arizona	1871	do	
P 1	Pasimachus elongatus, Lec	Camp Apache, Ariz	1873	H. W. Henshaw	Western States.
H	do	New Mexico	1874	(?)	Do.
1283	Pasimachus californicus, Chaud.	Camp Crittenden, Ariz	1874	J. M. Rutter	Texas to Arizona.
180	Cymindis cribricollis, Dej	Plains S. of Denver, Colo	1873	Dr. J. T. Rothrock	Eastern States to Oregon.
379 G	do	Fort Garland, Colo	1874	Lieut. S. Blunt	Do.
184	Cymindis reflexa, Lec	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	Do.
Y 7	Lebia atriceps, Lec	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Kansas, Colorado, New Mexico, Arizona.
A 3	Lebia viridis, Say	Pueblo, Colo	1874	C. E. Aiken	Eastern, Southern, Western States.
(?)	Platynus californicus, Dej	California and Nevada	1871	do	
(?)	Platynus subsericeus, Lec	Nevada	1871	do	
(?)	Platynus harrisii, Lec	do	1871	do	Northeast and West.
105 A	do	Taos, N. Mex	1874	Dr. H. C. Yarrow	Do.
(?)	Platynus chalceus, Lec	Nevada	1871	F. Bischoff	
197 A	Platynus placidus, Say	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Eastern and Western States.
184	do	Roaring Fork, Colo	1873	do	Do.
104	Platynus obsoletus, Say	South Park, Colo	1873	do	Northern, Eastern, Western States.
184	Pterostichus protractus, Lec	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	Nebraska, Colorado, Nevada
(?)	do	Nevada and California	1871	F. Bischoff	Do.
55 A	do	Fort Garland, Colo	1874	Dr. H. C. Yarrow	Western States.
(?)	Pterostichus scitulus, Lec	Nevada	1871	F. Bischoff	
(?)	Pterostichus lucublandus, Say	do	1871	do	
197 B	Pterostichus longulus, Lec	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Colorado and New Mexico.
184	do	Roaring Fork, Colo	1873	do	Do.
25	do	Fort Wingate, N. Mex	1873	H. W. Henshaw	Do.
166 A	do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
197 G	Pterostichus luczotii, Dej	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Northern and Western States to Oregon.
(?)	Amara scitula, Zim	California	1871	F. Bischoff	
(?)	Amara (Bradytus) libera, Lec	Utah	1872		
(?)	Amara fallax, Lec	Nevada	1871	F. Bischoff	
(?)	Amara interstitialis, Zim	do	1871	do	
(?)	Amara (Lirus) jacobinæ, Lec	Utah	1872		
184	Amara Eschscholtzii, Chaud.	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	High peaks of Colorado and Alaska.
180	do	Sonth of Denver, Colo	1873	do	Do.
371 B	Amara confusa, Lec	Rio Grande, Colo	1873	H. W. Henshaw	Colorado, Nebraska, Utah.
1?	do	Between Santa Fé and Fort Wingate, N. Mex.	1873	T. V. Brown	Do.
577	Amara obesa, Say	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Eastern, Southern, Western States.
H 52	Amara polita, Lec	New Mexico	1874	Dr. H. C. Yarrow	Western States.
(?)	Amara terrestris, Lec	do	1874	(?)	Do.
(?)	Chlænius sericeus, Say	California and Nevada	1871	F. Bischoff	
(?)	Chlænius pennsylvanicus, Say	do	1871	do	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	CARABIDÆ.				
(?)	Chlænius tricolor, Dej	California and Nevada	1871	F. Bischoff	
(?)	Chlænius solitarius, Say	New Mexico	1874	(?)	Southern and Western States.
(?)	Anisodactylus californicus, Dej.	California	1871	F. Bischoff	
(?)	Anisodactylus pitychrous, Lec.	do	1871	do	
(?)	Anisodactylus viridescens, Lec.	do	1871	do	
(?)	Agonoderus maculatus, Lec	do	1871	do	
1250	Agonoderus pallipes, Fabr	Santa Fé, N. Mex	1874	H. W. Henshaw	East, South, and West.
(?)	Diplochila obtusa, Lec	Nevada	1871	F. Bischoff	
(?)	Bradycellus rupestris, Say	do	1871	do	
(?)	Bradycellus californicus, Lec	Nevada and California	1871	do	
(?)	Stenolophus limbalis, Lec	do	1871	do	
(?)	Harpalus oblitus, Lec	Nevada	1871	do	
248 W	do	Pagosa, Colo	1874	C. E. Aiken	Western States.
(?)	Harpalus obesulus, Lec	Nevada	1871	F. Bischoff	
(?)	Harpalus caliginosus, Fabr	Utah	1872		
1324	Harpalus caliginosus, Fabr	Camp Lowell, Ariz	1874	Henry Johnson	East, South, and West.
104	Harpalus fraternus, Lec	South Park, Colo	1873	Dr. J. T. Rothrock	Western States to Oregon.
197 G	Harpalus amputatus, Say	San Luis Valley, Colo	1873	do	Kansas, Nebraska, New Mexico.
666	do	Denver, Colo	1873	H. W. Henshaw	Do.
H	do	New Mexico	1874	(?)	Colorado and New Mexico.
L 40	Harpalus retractus, Lec	do	1874	Dr. O. Loew	Western States.
105 A	Harpalus funestus, Lec	Taos, N. Mex	1874	Dr. H. C. Yarrow	Do.
105 A	Harpalus desertus, Lec	do	1874	do	Do.
1 ?	Cratognathus setosus, Lec	Between Santa Fé and Fort Wingate, N. Mex.	1873	T. V. Brown	
(?)	Bembidium 4-maculatum, Linn.	Nevada	1871	F. Bischoff	
(?)	Bembidium nevadense, Ulke	do	1871	do	
105 A	Bembidium perspicuum, Lec	Taos, N. Mex	1874	Dr. H. C. Yarrow	Western States.
166 A	Bembidium rapidum, Lec	San Ildefonso, N. Mex	1874	do	Do.
(?)	Nothopus zabroides, Lec	Vicinity of Abiquiu, N. Mex	1874	Dr. O. Loew	Do.
55 A	Cratacanthus dubius, Beauv	Fort Garland, Colo	1874	Dr. H. C. Yarrow	East, South, and West.
52 H	Piosoma setosum, Lec	Colorado Springs, Colo	1874	do	Kansas, Colorado, New Mexico.
	Discoderus impotens, Lec		1874		New Mexico and Arizona.
	DYTISCIDÆ.				
(?)	Agabus lugens, Lec	California	1871	F. Bischoff	
(?)	Agabus morosus, Lec	Nevada	1871	do	
(?)	Colymbetes binotatus, Har	do	1871	do	
M	do	Cañon de Chelle, N. Mex	1873	G. M. Keasbey	
195	do	Rio Grande, Colo	1873	Dr. J. T. Rothrock	
393	Colymbetes densus, Lec	Fort Garland, Colo	1873	H. W. Henshaw	Colorado, Nebraska, Wyoming.
P	Colymbetes sculptilis, Harris	New Mexico	1874	Dr. H. C. Yarrow	Eastern and Western States.
M	Laccophilus truncatus, Mann	Cañon de Chelle, N. Mex	1873	G. M. Keasbey	Western and Pacific States.
166 A	Laccophilus maculosus, Say	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Eastern and Western States.
1223	Hydroporus striatellus, Lec	Camp Lowell, Ariz	1874	H. W. Henshaw	Arizona to California.
149	Dytiscus marginicollis, Lec	South Park, Colo	1873	Dr. J. T. Rothrock	Western States.
197 G	do	San Luis Valley, Colo	1873	do	Do.
247 A	do	Tierra Amarilla, N. Mex	1874	Dr. H. C. Yarrow	Do.
273	Dytiscus confluens, Say	Pagosa, Colo	1874	do	Do.
(?)	Rhantus binotatus, Harris	(?)	1873	(?)	Eastern, Western, Pacific States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	HYDROPHILIDÆ.				
(?)	Hydrophilus californicus, Lec	California and Arizona	1871	F. Bischoff	
M	Hydrophilus glaber, Herbst	Cañon de Chelle, N. Mex	1873	G. M. Keasbey	Eastern, Southern, Western States.
666	do	Denver, Colo	1873	H. W. Henshaw	Do.
35	do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
(?)	do	New Mexico	1874	(?)	Do.
1301	Hydrophilus triangularis, Say	Arizona	1874	H. W. Henshaw	Everywhere.
	Hydrophilus sublævis, Lec		1874		Western States.
(?)	Hydrophilus ellipticus, Lec	Vicinity of Abiquiu, N. Mex	1874	Dr. O. Loew	Southern and Western States.
(?)	Hydrocharis glaucus, Lec	Arizona	1871	F. Bischoff	
1223	Berosus punctatissimus, Lec	Camp Lowell, Ariz	1874	H. W. Henshaw	Arizona to California.
	STRAPHYLINIDÆ.				
(?)	Creophilus villosus, Grav	California and Nevada	1871	F. Bischoff	Everywhere in United States.
197 G	do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Do.
103	do	Fort Garland to Costilla, Colo.	1874	Dr. H. C. Yarrow	Do.
(?)	Philonthus ænæus?, Rossi	California	1871	F. Bischoff	
184	Porrhodites brevicollis, Mäkl	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	High peaks of Colorado and Alaska.
	SILPHIDÆ.				
(?)	Necrophorus hecate, Bland	Nevada	1871	F. Bischoff	Western States.
103	do	Fort Garland to Costilla, Colo.	1874	Dr. H. C. Yarrow	Do.
179	Necrophorus Melsheimeri, Kirby.	Colorado	1873	Dr. J. T. Rothrock	Northern and Western States.
1018 A	do	San Carlos, Ariz	1874	J. M. Rutter	Do.
4	Necrophorus marginatus, Fabr.	Camp Apache, Ariz	1873	H. W. Henshaw	Western and Southwestern States.
(?)	Silpha lapponica, Herbst	Nevada and California	1871	F. Bischoff	
666	do	Denver, Colo	1873	H. W. Henshaw	All around the temperate and arctic parts of globe.
104	do	South Park, Colo	1873	Dr. J. T. Rothrock	Do.
(?)	do	Vicinity of Abiquiu, N. Mex	1874	Dr. O. Loew	Do.
(?)	Silpha truncata, Say	Nevada	1871	F. Bischoff	
500 A	do	Pescao, N. Mex	1873	H. W. Henshaw	
526	do	Arizona	1873	do	
H D	do	do	1873	Dr. O. Loew	
1279	do	Camp Crittenden, Ariz	1874	Henry Johnson	Kansas, New Mexico, Arizona.
(?)	Silpha ramosa, Say	California and Nevada	1871	F. Bischoff	Western and Pacific States.
180	do	Plains S. of Denver, Colo.	1873	Dr. J. T. Rothrock	Do.
4	do	Camp Apache, Ariz	1873	H. W. Henshaw	Do.
(?)	Philhydrus imbellis, Lec	Utah	1872		
	DERMESTIDÆ.				
(?)	Dermestes marmoratus, Say	California and Nevada	1871	F. Bischoff	Western and Pacific States.
666	do	Denver, Colo	1873	H. W. Henshaw	Do.
P	do	New Mexico	1874	Dr. H. C. Yarrow	Do.
666	Dermestes fasciatus, Lec	Denver, Colo	1873	H. W. Henshaw	Kansas, New Mexico, Utah.
666	Dermestes caninus, Germ	do	1873	do	Throughout United States.
1293	Dermestes vulpinus, Fabr	Near Camp Crittenden, Ariz.	1874	J. M. Rutter	From Atlantic to Pacific States.
	HISTERIDÆ.				
(?)	Saprinus lugens, Er	Nevada and California	1871	F. Bischoff	
666	do	Denver, Colo	1873	H. W. Henshaw	Western, Southwestern, and Pacific States.

Lisi of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	HISTERIDÆ.				
363	Saprinus lugens, Er.....	Camp Bowie, Ariz.....	1874	H. W. Henshaw....	Western, Southwestern, and Pacific States.
666	Hister Ulkei, Horn	Denver, Colo.....	1873	..... do	Kansas, Colorado, Wyoming.
	EROTYLIDÆ.				
A	Erotylus Boisduvalii, Lec...	Camp Apache, Ariz.....	1873	G. M. Keasbey.....	Colorado, New Mexico, Arizona.
698	..... do	..... do	1873	F. Klett	Do.
39	..... do	Denver to Georgetown, Colo.	1873	Dr. J. T. Rothrock..	Do.
L 40	..... do	New Mexico.....	1874	Dr. O. Loew.....	Do.
	PARNIDÆ.				
(?)	Helichus suturalis, Lec	Arizona	1871	F. Bischoff.....	
(?)	Helichus productus, Lec....	..... do	1871	..... do	
	SCARABÆIDÆ.				
(?)	Trox morsus, Lec.....	Arizona	1871	F. Bischoff.....	New Mexico and Arizona.
(?)	..... do	Camp Apache, Ariz.....	1874	J. M. Rutter	Do.
(?)	Trox alternans, Lec.....	Nevada and Arizona.....	1871	F. Bischoff.....	Western States.
29	..... do	Southern Arizona.....	1873	H. W. Henshaw	Do.
575	Trox punctatus, Germ	..... do	1873	..... do	Eastern, Southern, Western States.
Y 7	..... do	Colorado Springs, Colo....	1874	Dr. H. C. Yarrow...	Do.
736	Trox scutellaris, Say.....	Camp Grant, Ariz	1874	H. W. Henshaw	New Mexico and Arizona.
25	Canthon ebenus, Say.....	Fort Wingate, N. Mex....	1873	..... do	Western States.
246 F	..... do	Tierra Amarilla, N. Mex..	1874	Dr. H. C. Yarrow...	Do.
1324	Canthon hudsonias, Forst...	Camp Lowell, Ariz	1874	Henry Johnson	Eastern, Southern, Western States.
S	Phanæus carnifex, Fabr	Camp Apache, Ariz.....	1873	H. W. Henshaw	Do.
25	..... do	Fort Wingate, N. Mex....	1873	..... do	Do.
1297	..... do	Southern Arizona.....	1874	..... do	Do.
500 A	Serica curvata, Lec	Pescao, N. Mex	1873	..... do	Kansas, New Mexico.
393, 6	Serica frontalis, Lec	Fort Garland, Colo.....	1873	..... do	Southern and Western States.
4	Macrodactylus angustatus, Beauv.	Camp Apache, Ariz	1873	..... do	Do.
699 A	..... do	Arizona	1873	T. V. Brown.....	Do.
4	Diplotaxis brevicollis, Lec ..	Mineral Springs, Ariz.....	1873	H. W. Henshaw....	Western States.
575	..... do	Arizona	1873	..... do	Do.
D D	..... do	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
500	..... do	Pescao, N. Mex	1873	H. W. Henshaw	Do.
698	..... do	Camp Apache, Ariz.....	1873	F. Klett	Do.
371 B	..... do	Rio Grande, Colo.....	1873	H. W. Henshaw	Do.
1328	..... do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow...	Do.
D D	Diplotaxis frondicola, Lec...	Mineral Springs, Ariz.....	1873	F. Klett	Eastern, Southern, Western States.
379 A	Diplotaxis atratula, Lec.....	Pueblo, Colo	1874	A. Barnes	Colorado to Arizona and New Mexico.
(?)	Diplotaxis Haydenii, Lec....	(?)	1874	George Alborn	Western States.
1273	Athyreus serratus, Lec	Camp Lowell, Ariz.....	1874	H. W. Henshaw....	Arizona.
39	Bolboceras lazarus, Fabr....	Santa Fé, N. Mex.....	1874	Dr. J. T. Rothrock..	Southern and Western States.
A 3	Onthophagus latebrosus, Fabr.	Pueblo, Colo	1874	C. E. Aiken	Everywhere except Pacific States.
180	Lachnosterna fraterna, Lec .	South of Denver, Colo	1873	Dr. J. T. Rothrock..	Eastern, Southern, Western States.
118	Lachnosterna submucida, Lec	Southern Arizona.....	1874	J. M. Rutter	Arizona and New Mexico.
500 A	Listrochelus texanus, Lec ..	Pescao, N. Mex	1873	H. W. Henshaw....	Texas and New Mexico.
500	Polyphylla decemlineata, Say	..... do	1873	..... do	Western States.
118	..... do	Southern Arizona.....	1874	J. M. Rutter	Do.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	SCARABÆIDÆ.				
H D	Plusiotis gloriosa, Lec	Gila River, Ariz	1873	Dr. O. Loew	Arizona.
B	do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
698	do	do	1873	F. Klett	Do.
1097	do	Arizona	1874	H. W. Henshaw	Do.
699	Xyloryctes Satyrus, Fabr	Camp Apache, Ariz	1873	T. V. Brown	Eastern, Southern, Western States.
1273	do	Camp Lowell, Ariz	1874	H. W. Henshaw	Do.
699	Strategus Julianus, Burm	Camp Apache, Ariz	1873	T. V. Brown	Texas to Arizona; Mexico.
1195	Strategus cessus, Lec	Camp Bowie, Ariz	1874	H. W. Henshaw	Arizona.
B	Dynastes Tityus, Linn	Camp Apache, Ariz	1873	G. M. Keasbey	
Y 7	Tostegoptera lanceolata, Say	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Western States.
713 A	Cotalpa consobrina, Horn	Camp Lowell, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
L 40	Cyclocephala immaculata, Burm.	New Mexico	1874	Dr. O. Loew	East, South, West.
1273	Cyclocephala longula, Lec	Camp Lowell, Ariz	1874	H. W. Henshaw	Arizona.
39	Ligyrus gibbosus, Deg	Santa Fé, N. Mex	1874	Dr. J. T. Rothrock	Eastern and Western States.
1283	Allorhina mutabilis, Gory	Near Camp Crittenden, Ariz.	1874	J. M. Rutter	Texas to Arizona and New Mexico.
H 3	Euryomia inda, Linn	Pueblo, Colo	1874	Wm. H. Hance	Eastern, Southern, Western States.
	TRITOMIDÆ.				
29	Typhæa fumata, Linn	Southern Arizona	1873	H. W. Henshaw	Distributed by commerce all over the world.
	PHALACRIDÆ.				
H D	Olibrus striatulus, Lec	Gila River, Ariz	1873	Dr. O. Loew	
H 3	Phalacrus penicillatus, Say	Pueblo, Colo	1874	Wm. H. Hance	Western States.
104 A	Phalacrus politus, Mels	do	1874	Dr. H. C. Yarrow	Eastern and Western States.
	MELOLONTHIDÆ.				
(?)	Serica frontalis, Lec	California	1871	F. Bischoff	
(?)	Diplotaxis brevicollis, Lec	do	1871	do	
(?)	Diplotaxis obscura, Lec	California and Nevada	1871	do	
(?)	Polyphylla crinita, Lec	do	1871	do	
(?)	Cyclocephala longula, Lec	California	1871	do	
(?)	Xyloryctes satyrus, Fabr	Arizona	1871	do	
(?)	Cremastochilus angularis, Lec.	California	1871	do	
	LUCANIDÆ.				
36	Dorcus mazama, Lec	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	New Mexico.
1	do	do	1873	T. V. Brown	Do.
1328	do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Colorado to Arizona.
Y120	Passalus cornutus, Fabr	do	1874	do	Eastern, Southern, Western States.
	COCCINELLIDÆ.				
(?)	Anisosticata vittigera, Mann.	California	1871	F. Bischoff	New Mexico, Arizona, California.
(?)	do	Near Abiquiu, N. Mex	1874	Dr. O. Loew	Do.
(?)	Coccinella transversoguttata, Hald.	Nevada and California	1871	F. Bischoff	Everywhere.
179 G	do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Do.
197 B	do	do	1873	do	Do.
35	do	Colorado	1873	do	Do.
104	do	South Park, Colo	1873	do	Do.
	do	Eagle River, Colo	1873	do	Do.
184	do	Roaring Fork, Colo	1873	do	Do.
(?)	do	(?)	1874	George Alborn	Western States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	COCCINELLIDÆ.				
(?)	Coccinella 9-notata, Herbst.	Nevada	1871	F. Bischoff	
H 3	..... do	Pueblo, Colo	1874	Wm. H. Hance	Everywhere.
137 A	Coccinella monticola, Mels.	Taos, N. Mex	1874	Dr. H C. Yarrow	Western States.
104 A	Coccinella abdominalis, Say.	Pueblo, Colo	1874	..... do	Everywhere.
Y 7	Coccinella picta, Rand	Colorado Springs, Colo	1874	..... do	Northern, Eastern, Western States.
(?)	Hippodamia 13-punctata, Linn	California and Nevada	1871	F. Bischoff	
(?)	Hippodamia spuria, Lec	Nevada	1871	..... do	
(?)	Hippodamia 5-signata, Muls.	..... do	1871	..... do	
(?)	Hippodamia obsolcta, Lec.	California	1871	..... do	
184	Hippodamia parenthesis, Say	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	Everywhere.
104 A	..... do	Pueblo, Colo	1874	Dr. H. C. Yarrow	Do.
575	Hippodamia convergens, Guér.	Arizona	1873	H. W. Henshaw	Do.
305	..... do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
305	Hippodamia maculata, Deg.	..... do	1874	..... do	Do.
36	Epilachna maculiventris, Bld	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	
305	Epilachna corrupta, Muls	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Kansas to Arizona.
D D	Chilocorus bivulnerus, Muls.	Mineral Springs, Ariz	1873	F. Klett	Everywhere.
234 H	..... do	Tierra Amarilla, N. Mex	1874	W. G. Shedd	Eastern and Western States.
B 2	Hyperaspis fimbriolata, Mels	Pueblo, Colo	1874	A. Barnes	Do.
	CUCUJIDÆ.				
Y 120	Cucujus clavipes, Fabr	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
	NITIDULIDÆ.				
39	Carpophilus pallipennis, Say.	Santa Fé, N. Mex	1874	Dr. J. T. Rothrock	Everywhere.
L 40	Nitidula ziczac, Say	New Mexico	1874	Dr. O. Loew	Western States.
(?)	Meligethes ruficornis, Lec.	Near Abiquiu, N. Mex	1874	..... do	Do.
	ELMIDÆ.				
5	Elmis similis, Horn	Abiquiu, N. Mex. (Hot Springs).	1874	Dr. H. C. Yarrow	New Mexico to Arizona.
	BUPRESTIDÆ.				
(?)	Gyascutus obliteratus, Lec.	California	1871	F. Bischoff	
(?)	Gyascutus cælatus, Lec	Arizona	1874	(?)	Arizona.
1019 E	Gyascutus sphenicus, Lec.	San Carlos, Ariz	1874	H. W. Henshaw	Do.
(?)	Anthaxia retifera, Lec	California and Nevada	1871	F. Bischoff	
371 B	Calcophora angulicollis, Lec	Rio Grande, Colo	1873	H. W. Henshaw	Colorado and Oregon.
35	Poecilonota cyanipes, Say.	Thirty miles west of Denver, Colo.	1873	Dr. J. T. Rothrock	Western States.
393 C	Ancylochira confluens, Say	Fort Garland, Colo	1873	H. W. Henshaw	Do.
29	Ancylochira subornata, Lec.	Southern Arizona	1873	..... do	Colorado, Oregon.
4	Melanophila miranda, Lec.	Camp Apache, Ariz	1873	..... do	Colorado, New Mexico, Utah, Arizona.
445	..... do	Fort Wingate, N. Mex	1873	..... do	Do.
R 1	..... do	Camp Apache, Ariz	1873	Dr. O. Loew	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
699	..... do	Camp Apache, Ariz	1873	T. V. Brown	Do.
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew	Do.
A	..... do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
35 (?)	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
1330	..... do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	
104	Melanophila longipes, Say	South Park, Colo	1873	Dr. J. T. Rothrock	Northern, Western States; Alaska.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	BUPRESTIDÆ.				
(?)	Melanophila atropurpurea, Say.	Near Abiquiu, N. Mex...	1874	Dr. O. Loew.....	Western States.
61	Psiloptera Woodhousei, Lec.	Gila River, Ariz	1874	Dr. C. G. Newberry	New Mexico and Arizona.
1273	Psiloptera Webbii, Lec	Camp Lowell, Ariz.....	1874	H. W. Henshaw....	Arizona.
(?)	Acmæodera gibbula, Lec....	Arizona	1874	(?)	Do.
(?)	Agrilus politus, Say.....	Pueblo, Colo	1874	C. E. Aiken	Eastern, Southern, Western States.
	ELATERIDÆ.				
(?)	Cryptohypnus bicolor, Esch.	California.....	1871	F. Bischoff.....	Northern and Western States; Oregon.
184	..... do	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	Do.
(?)	Crepidotritus puberulus, Mann.	California.....	1871	F. Bischoff.....	
(?)	Limonius occidentalis, Cand.	..... do	1871	..... do	
(?)	Limonius nitidulus, Horn....	Nevada.....	1871	..... do	
(?)	Melanactes densus, Lec.....	California.....	1871	..... do	
(?)	Euthysanius pretiosus, Lec .	..... do	1871	..... do	
500 A	Anelastes Druryi, Kirby....	Pescao, N. Mex.....	1873	H. W. Henshaw ...	Southern, Western, and Pacific States.
698	..... do	Camp Apache, Ariz.....	1873	..... do	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Kiett.....	Do.
4	..... do	Camp Apache, Ariz.....	1873	H. W. Henshaw....	Do.
575	..... do	Arizona.....	1873	..... do	Do.
D D	..... do	Mineral Springs, Ariz.....	1873	T. V. Brown	Do.
1	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett.....	Do.
699 A	..... do	Arizona.....	1873	T. V. Brown.....	Do.
234 H	Monocrepidius vespertinus, Fabr.	Tierra Amarilla, N. Mex..	1873	W. G. Shedd.....	Eastern, Southern, Western States.
	TELEPHORIDÆ.				
(?)	Chauliognathus scutellaris, var., Lec.	Arizona.....	1871	F. Bischoff.....	
1273	..... do	Camp Lowell, Ariz.....	1874	H. W. Henshaw....	New Mexico, Arizona, Texas.
(?)	Chauliognathus basalis, Lec.	Tierra Amarilla, N. Mex..	1874	W. G. Shedd.....	New Mexico and Utah.
	MALACHIDÆ.				
(?)	Collops vittatus, Say.....	Nevada and California....	1871	F. Bischoff.....	
104	Collops cribrosus, Lec	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Kansas, New Mexico, Nevada.
1	Collops bipunctatus, Say....	Camp Apache, Ariz.....	1873	H. W. Henshaw....	Kansas, New Mexico, Colorado.
A	..... do	..... do	1873	G. M. Keasbey.....	Do.
L	..... do	New Mexico.....	1874	Dr. O. Loew.....	Kansas, New Mexico, Colorado, Arizona.
500 A	Collops 4-maculatus, Fabr..	Pescao, N. Mex	1873	H. W. Henshaw....	Eastern, Southern, Western States.
575	..... do	Arizona.....	1873	..... do	Do.
H D	Pristoscelis serrulatus, Lec..	Gila River, Ariz	1873	Dr. O. Loew.....	Arizona.
H D	Listrus senilis, Lec.....	..... do	1873	..... do	
(?)	Dasytes senilis, Lec.....	Nevada.....	1871	F. Bischoff.....	
(?)	Dasytes ruficollis, Ulke	..... do	1871	..... do	
	LAMPHYRIDÆ.				
184	Podabrus lævicollis, Kirby..	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	
	CLERIDÆ.				
(?)	Trichodes ornatus, Say.....	Nevada and California....	1871	F. Bischoff.....	
(?)	Clerus moestus, Klug.....	California.....	1871	..... do	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	CLERIDÆ.				
1185	Clerus spinolæ, Lec	Camp Bowie, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
699 A	Clerus nigriventris, Lec	Arizona	1873	T. V. Brown	Do.
699 A	Cymatodera cancellata, Lec	do	1873	do	Do.
	SPONDYLIDÆ.				
247 A	Parandra brunnea, Fabr	Tierra Amarilla, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
	CERAMBYCIDÆ.				
(?)	Prionus californicus, Motsch	California	1871	F. Bischoff	
657	do	Arizona	1873	Dr. O. Loew	Nebraska, Arizona, and Pacific States.
A	do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
1223	do	Camp Lowell, Ariz	1874	H. W. Henshaw	Do.
(?)	Criocephalus productus, Lec	California	1871	F. Bischoff	
500	Criocephalus agrestis, Kirby	Pescao, N. Mex	1873	H. W. Henshaw	Northern and Western States.
D D	do	Mineral Springs, Ariz	1873	F. Klett	Do.
699	do	Camp Apache, Ariz	1873	T. V. Brown	Do.
	do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
1	do	do	1873	T. V. Brown	Do.
180	do	Plains S. of Denver, Colo	1873	Dr. J. T. Rothrock	Do.
(?)	Criocephalus asperatus, Lec	New Mexico	1874	Dr. O. Loew	New Mexico and Arizona.
(?)	Crossidius intermedius, Ulke	Arizona	1871	F. Bischoff	
(?)	Monohammus clamator, Lec	California	1871	do	
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Nebraska, New Mexico.
234 II	do	Tierra Amarilla, N. Mex	1874	W. G. Shedd	Western States.
247 A	Monohammus scutellatus, Say	do	1874	Dr. H. C. Yarrow	Atlantic to Pacific States.
(?)	Callidium janthinum, Lec	California	1871	F. Bischoff	
(?)	Tetraopes basalis, Lec	Arizona	1871	do	
L 40	Tetraopes femoratus, Lec	New Mexico	1874	Dr. O. Loew	Southern and Western States.
A 3	Tetraopes canescens, Lec	Pueblo, Colo	1874	C. E. Aiken	Western States.
B 2	Tetraopes annulatus, Lec	do	1874	A. Barnes	Kansas, Colorado, New Mexico.
(?)	Acmæops strigilata, Fabr	Nevada	1871	F. Bischoff	
(?)	Acmæops marginalis, Lec	do	1871	do	
(?)	Leptura convexa, Lec	Nevada and California	1871	do	
246 F	Leptura cribripennis, Lec	Tierra Amarilla, N. Mex	1874	Dr. H. C. Yarrow	Colorado and New Mexico.
371 B	Asemum atrum, Esch	Rio Grande, Colo	1873	H. W. Henshaw	Colorado and Oregon.
183	Argaleus lituratus, Kirby	Colorado	1873	Dr. J. T. Rothrock	High peaks of Colorado; Hudson Bay; Alaska.
180	do	Twin Lakes, Colo	1873	do	Do.
179	do	Colorado	1873	do	Do.
52	do	Camp Apache, Ariz	1873	H. W. Henshaw	Do.
1	Plectrodera scalator, Fabr	do	1873	do	Eastern, Southern, Western States.
699	Calloides nobilis, Say	do	1873	T. V. Brown	Northern, Eastern, Western States.
371 B	Stenocorus lineatus, Oliv	Rio Grande, Colo	1873	H. W. Henshaw	Northern, Eastern, Western, Southern States.
A	Monilema crassum, Lec	Camp Apache, Ariz	1873	G. M. Keasbey	Texas, Arizona, New Mexico.
699	do	do	1873	T. V. Brown	Do.
B 6	Monilema lævigatum, Bland	Pueblo, Colo	1874	A. Barnes	Colorado and New Mexico.
52 H	Ergates spiculatus, Lec	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Colorado to Arizona.
1301	Mallodon angularis, Lec	Arizona	1874	Henry Johnson	Arizona.
118	Elaphidion procerum, Lec	Southern Arizona	1874	J. M. Rutter	Kansas to Arizona.
363	Callichroma plicatum, Lec	Camp Bowie, Ariz	1874	H. W. Henshaw	Texas to Arizona.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	CERAMBYCIDÆ.				
(?)	Dendrobias quadrimaculatus, Dup.	Arizona	1874	(?)	Texas to Arizona.
(?)	Batyle Pearsalli, Bland	New Mexico	1874	Dr. O. Loew	Colorado and New Mexico.
713 A	Perarthrus vittatus, Lec	Camp Lowell, Ariz	1874	J. M. Rutter	Louisiana, Texas, Arizona.
1019 E	Cyllene infaustus, Lec	San Carlos, Ariz	1874	H. W. Henshaw	Western States.
P	Xylotrechus sagittatus, Germ	New Mexico	1874	Dr. H. C. Yarrow	Southern and Western States.
247 A	Pachyta liturata, Kirby	Tierra Amarilla, N. Mex.	1874	do	Northern and Western States to Alaska.
	CHRYSOMELIDÆ.				
(?)	Saxinis saucia, Lec	California and Nevada	1871	F. Bischoff	
(?)	Glyptoscelis albidus, Lec	California	1871	do	
(?)	Chrysochus cobaltinus, Lec	California and Nevada	1871	do	
577	do	Camp Apache, Ariz	1873	H. W. Henshaw	Western and Pacific States.
(?)	do	New Mexico	1874	Dr. O. Loew	Kansas to California.
H 3	Chrysochus auratus, Fabr	Pueblo, Colo	1874	Wm. H. Hance	Eastern and Western States.
(?)	Chrysomela multipunctata, Say.	California and Nevada	1871	F. Bischoff	
(?)	Chrysomela tortuosa, Rogers	Arizona	1871	do	
(?)	do	do	1874	(?)	Arizona and New Mexico.
35 (?)	Chrysomela exclamationis, Fabr.	Colorado	1873	Dr. J. T. Rothrock	Western and Southwestern States.
B 6	do	Pueblo, Colo	1874	A. Barnes	Do.
B 6	Chrysomela 10-lineata, Say	do	1874	do	Southern and Western States.
(?)	Chrysomela serpentina, Rog	Arizona	1874	(?)	Arizona.
(?)	Diabrotica tenella, Lec	do	1871	F. Bischoff	
H 3	Diabrotica tricincta, Say	Pueblo, Colo	1874	Wm. H. Hance	Kansas to Arizona.
H D	do	Gila River, Ariz	1873	Dr. O. Loew	Do.
(?)	Disonycha punctigera, Lec	California and Nevada	1871	F. Bischoff	
160 A	do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States to California.
248 W	Disonycha alternata, Ill	Pagosa, Colo	1874	C. E. Aiken	Southern and Western States.
52 H	Disonycha triangularis, Say	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Do.
(?)	Trirhabda attenuata, Say	Nevada	1871	F. Bischoff	
(?)	Trirhabda canadensis, Kirby	California and Nevada	1871	do	
1	Trirhabda convergens, Lec	Santa Fé to Fort Wingate, N. Mex.	1873	T. V. Brown	Nebraska, New Mexico, Nova Scotia.
(?)	Haltica opulenta, Lec	Nevada	1871	F. Bischoff	
(?)	Cassida 6-punctata?, Fabr	do	1871	do	
H D	Colaspis convexa, Say	Gila River, Ariz	1873	Dr. O. Loew	Southern, Eastern, Western States.
52 H	Colaspis tristis, Oliv	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Do.
35	Luperus longulus, Lec	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Colorado, Nebraska, Nevada.
1184	Lema nigrovittata, Guer	Camp Bowie, Ariz	1874	J. M. Rutter	Texas and Arizona to California.
(?)	Coscinoptera pyropyga, Lac	Arizona	1874	(?)	Arizona and New Mexico.
A 3	Plagiodera scripta, Fabr	Pueblo, Colo	1874	C. E. Aiken	Everywhere.
1328	Plagiodera oviformis, Lec	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States.
(?)	Monoxia obtusa, Lec	Vicinity of Abiquiu, N. Mex	1874	Dr. O. Loew	New Mexico and Arizona.
B 2	Monoxia guttulata, Lec	Pueblo, Colo	1874	A. Barnes	Western States.
104 A	Graptodera carinata, Germ	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
1328	Graptodera suplicata, Lec	do	1874	do	Kansas to California.
52 H	Graptodera foliacea, Lec	Colorado Springs, Colo	1874	do	Western States.
H 3	Orchestris albionica, Lec	Pueblo, Colo	1874	Wm. H. Hance	Texas to California.
B 2	Orchestris Lewisii, Crotch	do	1874	A. Barnes	Western States.
52 H	Systena mitis, Lec	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Do.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	TENEBRIONIDÆ.				
(?)	Edrotes ventricosus, Lec....	California.....	1871	F. Bischoff.....	
(?)	Emmenastus longulus, Lec..	Arizona	1871	..... do	
1311	..... do	..... do	1874	H. W. Henshaw....	Arizona.
(?)	Cryptoglossa (?) -	Utah	1872	..... do	
(?)	Asida marginata, Lec.....	Arizona.....	1871	F. Bischoff.....	
(?)	Asida confluens, Lec.....	Utah	1872	Dr. H. C. Yarrow..	
M	..... do	Cañon de Chelle, N. Mex	1873	G. M. Keasbey ...	Colorado Desert.
H D	Asida sordida, Lec.....	Gila River, Ariz	1873	Dr. O. Loew	Colorado and New Mexico.
197 G	..... do	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Do.
5	..... do	Colorado Chiquito River..	1873	Dr. C. G. Newberry.	Do.
1015	..... do	Rio Grande, Colo	1874	Dr. O. Loew.....	Colorado, New Mexico, and Arizona.
698	Asida convexa, Lec	Camp Apache, Ariz.....	1873	F. Klett.....	Do.
248 W	..... do	Pagosa, Colo	1874	C. E. Aiken.....	Do.
H D	Asida rimata, Lec	Gila River, Ariz	1873	Dr. O. Loew	Arizona.
D D	..... do	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
1015	..... do	Camp Lowell, Ariz..	1874	J. M. Rutter.....	Arizona to Colorado.
M	Asida elata, Lec	Cañon de Chelle, N. Mex	1873	G. M. Keasbey ...	Texas to Oregon.
(?)	..... do	Abiquiu to Jemez, N. Mex.	1874	G. Thompson.....	Do.
A 3	Asida opaca, Say.....	Pueblo, Colo	1874	C. E. Aiken.....	Western States.
1283	Asida costipennis, Lec.....	Camp Crittenden, Ariz....	1874	J. M. Rutter.....	New Mexico and Arizona.
1015	Asida convexicollis, Lec	Camp Lowell, Ariz	1874	..... do	Do.
1279	Asida subcylindrica, Horn..	Camp Crittenden, Ariz ..	1874	Henry Johnson	Arizona.
(?)	Eusattus reticulatus, Lec....	Arizona	1871	F. Bischoff.....	
500	..... do	Pescao, N. Mex	1873	H. W. Henshaw....	New Mexico and Arizona.
500 A	..... do	..... do	1873	..... do	Do.
699	..... do	Camp Apache, Ariz.....	1873	T. V. Brown	Do.
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew.....	Do.
35	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	..... do	Do.
(?)	..... do	New Mexico	1874	..... do	Kansas to Arizona.
(?)	Eusattus muricatus, Lec ...	California and Nevada....	1871	F. Bischoff.....	
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew..	New Mexico to Oregon.
(?)	Eusattus difficilis, Lec.....	New Mexico	1874	..... do	New Mexico and Arizona.
(?)	Coniontis robusta, Horn.....	California.....	1871	F. Bischoff.....	
(?)	Coniontis nemoralis, Esch...	..... do	1871	..... do	
180	Coniontis ovalis, Lec.....	Plains S. of Denver, Colo..	1873	Dr. J. T. Rothrock..	Colorado, Utah, Oregon.
(?)	Eleodes obscura, Say	Nevada	1871	F. Bischoff.....	
1014	..... do	Camp Lowell, Ariz.....	1874	J. M. Rutter	Oregon to Arizona.
(?)	Eleodes sulcipennis, Mann..	Arizona	1871	F. Bischoff.....	
713 A	..... do	Camp Lowell, Ariz	1874	J. M. Rutter.....	Oregon, through California, Nevada and New Mexico, to Arizona.
(?)	Eleodes carbonaria, Say	Nevada.....	1871	F. Bischoff.....	Colorado, New Mexico, Arizona, and Texas.
H D	..... do	Gila River, Ariz.....	1873	Dr. O. Loew.....	Do.
L 10	..... do	New Mexico.....	1874	..... do	Do.
(?)	Eleodes obsoleta, Say.....	Nevada	1871	F. Bischoff.....	
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew.....	Kansas, New Mexico, Arizona.
197 G	..... do	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
104	..... do	South Park, Colo.....	1873	Dr. J. T. Rothrock ..	Do.
A 3	..... do	Pueblo, Colo.....	1874	C. E. Aiken	Do.
(?)	Eleodes humeralis, Lec	California	1871	F. Bischoff.....	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	TENEBRIONIDÆ.				
(?)	Eleodes extricata, Say	California, Nevada, Arizona.	1871	F. Bischoff	
371 B	do	Rio Grande, Colo	1873	H. W. Henshaw	Western States to Oregon.
4	do	Camp Apache, Ariz	1873	do	Do.
197 G	do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Do.
D D	do	Mineral Springs, Ariz	1873	F. Klett	Do.
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	do	Do.
35	do	do	1873	Dr. O. Loew	Do.
248 W	do	Pagosa, Colo	1874	C. E. Aiken	Western States.
(?)	Eleodes armata, Lec	Arizona	1871	F. Bischoff	
(?)	Eleodes longicollis, Lec	do	1871	do	
1014	do	Camp Lowell, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
(?)	Eleodes grandicollis, Mann	California and Nevada	1871	F. Bischoff	
(?)	Eleodes nigrina, Lec	Nevada	1871	do	
105 A	do	Taos, N. Mex	1874	Dr. H. C. Yarrow	Kansas to Oregon.
(?)	Eleodes hispilabris, Say	Nevada and Arizona	1871	F. Bischoff	Texas, Kansas, Colorado, Arizona, Oregon.
H D	do	Gila River, Ariz	1873	Dr. O. Loew	Do.
197 G	do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Do.
393 C	do	Fort Garland, Colo	1873	H. W. Henshaw	Do.
698	do	Camp Apache, Ariz	1873	F. Klett	Do.
180	do	Plains S. of Denver, Colo	1873	Dr. J. T. Rothrock	Do.
379 G	do	Fort Garland, Colo	1874	Lieut. S. Blunt	Western States.
(?)	Eleodes hirsuta, Lec	California	1871	F. Bischoff	
(?)	Eleodes tenebrosa, Horn	do	1871	do	
445	Eleodes dispersa, Lec	Fort Wingate, N. Mex	1873	H. W. Henshaw	New Mexico.
	do	Camp Apache, Ariz	1873	do	Do.
R 1	do	do	1873	Dr. O. Loew	Do.
25	do	Fort Wingate, N. Mex	1873	H. W. Henshaw	Do.
500 A	do	Pescao, N Mex	1873	do	Do.
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
35(?)	do	do	1873	Dr. O. Loew	Do.
1(?)	do	do	1873	T. V. Brown	Do.
(?)	do	Taos, N. Mex	1874	(?)	New Mexico and Arizona.
R 1	Eleodes suturalis, Say	Camp Apache, Ariz	1873	Dr. O. Loew	Kansas, Nebraska, New Mexico, Colorado
500 A	Eleodes tricostata, Say	Pescao, N. Mex	1873	H. W. Henshaw	Texas and Western States.
500	do	do	1873	do	Do.
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
1	do	do	1873	T. V. Brown	Do.
(?)	do	Abiquiu, N. Mex	1874	Dr. O. Loew	Southern and Western States.
104	Eleodes quadricollis, Esch	South Park, Colo	1873	Dr. J. T. Rothrock	Colorado to California.
1(?)	do	Santa Fé to Fort Wingate, N. Mex.	1873	T. V. Brown	Do.
271 E	do	Pagosa, Colo	1874	Dr. H. C. Yarrow	Do.
	Eleodes caudifera, Lec	Camp Apache, Ariz	1873	H. W. Henshaw	Colorado and New Mexico.
500 A	do	Pescao, N. Mex	1873	do	Do.
35	do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
1	do	do	1873	T. V. Brown	Do.
184	Eleodes pimelioides, Mann	Roaring Fork, Colo	1873	Dr. J. T. Rothrock	
4	Eleodes arata, Lec	Camp Apache, Ariz	1873	H. W. Henshaw	
A	do	do	1873	G. M. Keasbey	
D D	do	Mineral Springs, Ariz	1873	F. Klett	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	TENEBRIONIDÆ.				
25	Eleodes arata, Lec	Fort Wingate, N. Mex	1873	H. W. Henshaw	
1184	do	Camp Bowie, Ariz	1874	J. M. Rutter	Arizona and New Mexico.
(?)	Elcodes sponsa, Lec	Taos, N. Mex	1874	(?)	Do.
(?)	Blapstinus dilatatus, Lec	Arizona	1871	F. Bischoff	
1330	Blapstinus pratensis, Lec	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States.
(?)	Cerenopus sulcipennis, Lec	Arizona	1871	F. Bischoff	
(?)	Coelocnemis punctata, Lec	California and Arizona	1871	do	
52	Epitragus canaliculatus, Say	Camp Apache, Ariz	1873	H. W. Henshaw	Colorado, New Mexico, Arizona.
1019 E	do	San Carlos, Ariz	1874	do	Western States.
H 1	Epitragus pruinosus, Horn	Camp Bowie, Ariz	1874	do	Arizona.
1273	Eurymetopon rufipes, Esch	Camp Lowell, Ariz	1874	do	Arizona and California.
D D	Embaphion contusum, Lec	Mineral Springs, Ariz	1873	F. Klett	
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	do	
445	do	Fort Wingate, N. Mex	1873	H. W. Henshaw	
500 A	do	Pescao, N. Mex	1873	do	
385	Embaphion planum, Horn	San Juan River, N. Mex	1874	Lieut. R. Birnie	New Mexico and Arizona.
105 A	Trimytis pruinosa, Lec	Taos, N. Mex	1874	Dr. H. C. Yarrow	Western States.
(?)	Ipthimus sublævis, Bland	do	1874	(?)	New Mexico.
Y120	Nyctobates pennsylvanica, De Geer.	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
	MELOIDÆ.				
(?)	Epicauta oblita, Lec	California	1871	F. Bischoff	
(?)	Epicauta Wheeleri, Ulke	Arizona	1871	do	
(?)	Epicauta maculata, Say	Nevada	1871	do	
4	do	Camp Apache, Ariz	1873	H. W. Henshaw	Southern and Western States to California and Oregon.
(?)	do	New Mexico	1874	Dr. O. Loew	Texas to Kansas and Oregon.
35	Epicauta conspersa, Lec	Santa Fé to Fort Wingate, N. Mex.	1873	do	New Mexico, Colorado.
104	Epicauta pruinosa, Lec	South Park, Colo	1873	Dr. J. T. Rothrock	
169	do	San Luis Valley, Colo	1873	do	
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	
Y120	Epicauta pensylvanica, De Geer.	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
S	Epicauta corvina, Lec	Camp Apache, Ariz	1873	H. W. Henshaw	Colorado to Arizona.
(?)	Lytta vulnerata, Lec	California and Arizona	1871	F. Bischoff	
(?)	Lytta lugubris, Ulke	California	1871	do	
104	Lytta nuttalli var. fulgifera, Lec.	South Park, Colo	1873	Dr. J. T. Rothrock	Kansas, Colorado, Nebraska, Montana.
104	Lytta sphæricollis, Say	do	1873	do	Do.
A	Lytta biguttata, Lec	Camp Apache, Ariz	1873	G. M. Keasbey	Arizona and New Mexico.
(?)	Nemognatha bicolor, Lec	California and Nevada	1871	F. Bischoff	
52 H	do	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Western States.
(?)	Nemognatha lurida, Lec	California	1871	F. Bischoff	
445	do	Fort Wingate, N. Mex	1873	H. W. Henshaw	Kansas, New Mexico, Arizona.
L 32	do	New Mexico	1874	Dr. O. Loew	Western States.
(?)	Nemognatha apicalis, Lec	Nevada	1871	F. Bischoff	
B 6	do	Pueblo, Colo	1874	A. Barnes	Kansas, Colorado, New Mexico, Arizona.
500 A	Nemognatha nigripennis, Lec.	Pescao, N. Mex	1873	H. W. Henshaw	Texas, New Mexico, Arizona.
L 32	Nemognatha immaculata, Say.	New Mexico	1874	Dr. O. Loew	Texas and Kansas to Arizona.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
	MELOIDÆ.				
B	Megetra vittata, Lec	Camp Apache, Ariz	1873	G. M. Keasbey	New Mexico and Arizona.
S 1	do	Arizona	1873	E. E. Howell	Do.
A	do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
M	do	Cañon de Chelle, N. Mex	1873	do	Do.
699	do	Camp Apache, Ariz	1873	T. V. Brown	Do.
H D	do	Gila River, Ariz	1873	Dr. O. Loew	Do.
L 10	do	New Mexico	1874	do	Do.
35	Pyrota terminata, Lec	Thirty miles west of Denver, Colo.	1873	Dr. J. T. Rothrock	Texas and Colorado.
1273	Pyrota mylabrina, Chevr	Camp Lowell, Ariz	1874	H. W. Henshaw	Colorado, New Mexico, Arizona.
L	Meloe sublævis, Lec	New Mexico	1874	Dr. O. Loew	New Mexico.
1297	Macrobasis immaculata, Say	Southern Arizona	1874	H. W. Henshaw	Texas to Arizona.
166 A	Macrobasis segmentata, Say	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States.
A 3	Zonitis atripennis, Say	Pueblo, Colo	1874	C. E. Aiken	Do.
161	Zonitis flavida, Lec	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Do.
H 3	Zonitis bilineata, Say	Pueblo, Colo	1874	Wm. H. Hance	Do.
379 A	Gnathium minimum, Say	do	1874	A. Barnes	Do.
	CURCULIONIDÆ.				
(?)	Sphenophorus simplex, Lec	California and Nevada	1871	F. Bischoff	
(?)	Sphenophorus gentilis, Lec	do	1871	do	
1330	Sphenophorus 13-punctatus, Ill.	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Atlantic to Pacific States.
35	Calandra remotepunctata, Gyll.	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Distributed by commerce everywhere.
(?)	Tanymecus lautus, Lec	Arizona	1874	(?)	Arizona.
236 C	Ophryastes vittatus, Say	Tierra Amarilla, N. Mex	1874	Prof. E. D. Cope	Western States.
(?)	Cleonus trivittatus, Say	(?)	1874	George Alborn	Do.
(?)	Larinus molitor, Lec	Arizona	1874	(?)	Arizona.
1330	Balaninus constrictus, Say	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States.
.....	Rhynchites æneus, Boh	.....	1874	.....	Eastern and Western States.
	SCOLYTIDÆ.				
371 B	Dendroctonus terebrans, Lec	Rio Grande, Colo	1873	H. W. Henshaw	
(?)	do	California	1871	F. Bischoff	
52 H	do	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Everywhere.
.....	Hylastes gracilis, Lec	.....	1874	.....	Western States.
	ŒDEMERIDÆ.				
1297	Oxacis pallida, Lec	Southern Arizona	1874	H. W. Henshaw	New Mexico and Arizona.
	ANTHICIDÆ.				
55 A	Notoxus serratus, Lec	Fort Garland, Colo	1874	Dr. H. C. Yarrow	Western States.
L	Notoxus subtilis, Lec	New Mexico	1874	Dr. O. Loew	Do.
	MELANDRYIDÆ.				
Y 120	Penthe pimelia, Fabr	San Illdefonso, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
	MORDELLIDÆ.				
B 2	Mordellistena æmula, Lec	Pueblo, Colo	1874	A. Barnes	Western States.
	BRUCHIDÆ.				
160 A	Bruchus fraterculus, Horn	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Western States.

Number of Species collected.

Cicindelidæ	10	Elateridæ	8
Carabidæ	69	Telephoridæ	3
Dytiscidæ	11	Malachidæ	8
Hydrophilidæ	7	Lampyridæ	1
Staphylinidæ	3	Cleridæ	5
Silphidæ	7	Spondylidæ	1
Dermestidæ	4	Cerambycidæ	33
Histeridæ	2	Chrysomelidæ	34
Erotylidæ	1	Tenebrionidæ	52
Parnidæ	2	Meloidæ	27
Scarabæidæ	33	Curculionidæ	10
Tritomidæ	1	Scolytidæ	2
Phalacridæ	3	Œdemeridæ	1
Melolonthidæ	7	Anthicidæ	2
Lucanidæ	2	Melandryidæ	1
Coccinellidæ	17	Mordellidæ	1
Cucujidæ	1	Bruchidæ	1
Nitidulidæ	3		
Elmidæ	1	Total	389
Buprestidæ	51		

1

2

3

4

5

T. Sinclair & Son, Lith. Phila.

FIG. 1. CROSSIDIUS INTERMEDIUS. FIG. 2. LYTTA LUGUBRIS
FIG. 3 BEMBIDIUM NEVADENSIS. FIG. 4 EPICAUTA WHEELERI
FIG. 5 DASYTES RUFICOLLIS.

CHAPTER XII.

REPORT

UPON

THE COLLECTIONS OF HEMIPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1873, AND 1874.

BY

Prof. P. R. UHLER.

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CHAPTER XII.

The specimens of *Hemiptera* from this expedition, sent to me for examination, are few in number, but they embrace some very interesting species.

A *Calocoris*, which I have provisionally separated from *C. rapidus*, Say, may be the extreme limit of bright color attained by that species. I suspect this to be the case, because specimens of that species, from the less considerable elevations in Colorado Territory, retain the black spots of the pronotum, and some of the fuscous-gray of the hemelytra which obtains in the specimens from the Atlantic region.

The *Corisas* exhibit the minute vermiculate and less distinct marking common to most of the species from Mexico. *Chlorochroa Sayi*, Stål, the most beautiful green Pentatomid of the West, seems to find its most congenial home in Owen's Valley, and must be quite abundant there, if we may judge from the large proportion of them brought home by the expedition.

CORIMELAENIDAE.

CORIMELAENA, White.

CORIMELAENA EXTENSA, Uhler.

PLATE XLII, FIG. 6.

Corimelaena extensa, UHLER, Proc. Ent. Soc. Phila., 1863, 155.

Obtained in Owen's Valley, California, by F. Bischoff. Previously reported from Dakota, Arizona, Vancouver's Island, and San Francisco.

PENTATOMIDAE.

BROCHYMENA, Amyot et Serv.

BROCHYMENA OBSCURA, Amyot et Serv.

Brochymena obscura, H. SCHF., Wanz. Ins., v, 68, f. 513.

One specimen, of more distinct pattern of punctation than usual, from Owen's Valley, California, taken by F. Bischoff.

PERILLUS, Stål.

PERILLUS CLAUDUS, Say.

Perillus claudus, SAY, Jour. Acad. Nat. Sci. Phila., iv, 312.

From Owen's Valley, California, by F. Bischoff.

COSMOPEPLA, Stål.

COSMOPEPLA CONSPICILLARIS, Dallas.

Cosmopepla conspicillaris, DALLAS, Brit. Mus. Hemipt., i, 225.

From Owen's Valley (F. Bischoff). This is a most variable species in both color and size. Specimens measure from 4 to 7½ millimeters in length, by 3 to 5 millimeters in width. The orange band across the pronotum sometimes invades almost two-thirds of its surface posteriorly, and the black color is replaced by pale dirty rufous.

LIODERMA, Uhler.

LIODERMA VIRIDICATA, Uhler, *sp. nov.*

PLATE XLII, FIG. 11.

Ovate, polished, bright grass-green above, tolerably coarsely, deeply, and here and there confluently punctured between transverse, wavy rugæ; beneath very finely, remotely punctured, excepting on the disks of the pleural pieces, which are more coarsely punctured. Head as long as the pronotum, triangularly rounded in front, transversely rugulose; the lateral margins whitish, and more finely and less closely punctured than the vertex; tylus smooth, very remotely punctured, the tip piceous; antennæ,—basal joint and basal half of second joint green, the apical half of second and the remaining joints piceous, pubescent; the second joint longest, the third not more than one-half the second, the fourth and fifth shorter, subequal. Rostrum reaching to the base of the third ventral segment, green, with the base, the middle line and the apical joint piceous, second joint very long, reaching from the base of the head to the middle coxæ, the apical joint shortest. Pronotum flattened, but with a slightly convex slant forward and sideways; the lateral margins broadly whitish, bowed; the anterior angles truncated, to fit against the eyes; the posterior angles broadly rounded; the anterior margin broadly sinuated; the posterior margin straight, but sinuated each

side at the humeri; callosities smooth, almost impunctured, bounded behind by an impressed line. Mesosternum slenderly and feebly carinated. Legs green, clothed with long, slender, remote hairs, the tarsi and tip of tibiæ piceous; femora with remote wrinkles. Scutellum broad and blunt, almost flat, the apex broadly white. Outer margin of corium broadly yellowish-white; the membrane dusky. Tergum minutely punctured, dusky on the disk, excepting two or three of the apical segments.

Length, 8–9 millimeters; humeral width, $4\frac{1}{2}$–$5\frac{1}{4}$ millimeters.

Taken by Dr. J. T. Rothrock, from near Roaring Fork, Colorado.

CHLOROCHROA, Stål.

CHLOROCHROA SAYI Stål.

Chlorochroa sayi, STÅL, Svenska Vetensk. Akad. Handl., x, 33, No. 6.

Many specimens from Owen's Valley, (F. Bischoff); also from Snake River and from Teton Basin (Dr. Josiah Curtis); and from Roaring Fork (Dr. J. T. Rothrock). Specimens had been previously collected in Arizona and near San Francisco by Dr. George Horn.

COREIDAE.

METAPODIUS, Westw.

METAPODIUS GRANULOSUS, Dallas.

Metapodius granulosus, DALLAS. Brit. Mus. Cat. Hemipt., ii, 430, No. 7.
Metapodius thomasi, UHLER, U. S. Geol. Surv. Terr., 1872, 399.

Collected by Dr. Oscar Loew near the Gila River, Arizona, in October. After a close examination of other and darker specimens, and on a minute comparison with the original description and with specimens from Mexico, I am enabled to perceive that the name given by me belongs to a pale variety of the species, and must be set aside as a synonym

PACHYLIS, Lep.

PACHYLIS GIGAS, Burm.

Pachylis gigas, BURM., Handb., ii, 338, No. 3.

Collected in Southern Arizona by H. W. Henshaw. This is a Mexican form, which has not hitherto been reported from the United States.

LEPTOGLOSSUS, Guer.

LEPTOGLOSSUS CORCULUS, Say.

1 *Leptoglossus corculus*, SAY, Hemipt. New Harmony, 12, No. 1.

From Owen's Valley, California, by F. Bischoff.

ALYDUS, Fab.

ALYDUS EURINUS, Say.

1. *Alydus eurinus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 324, No. 5.

Common in many parts of the United States, both East and West of the Mississippi River.

From near Gila River, Arizona, by Dr. Oscar Loew.

This species is not confined to the West, but occurs also in most parts of the Eastern United States.

ALYDUS QUINQUESPINOSUS, Say.

2 *Alydus quinquespinosus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 323.

A damaged specimen from Owen's Valley, California, by F. Bischoff. It differs from the usual type in having less black on the pronotum, in lacking the white base of apical joint of antennæ, and in having the humeral angles more acute.

CATORHINTHA, Stål.

CATORHINTHA SELECTOR, Stål.

Catorhintha selector, STÅL, Ofversigt Vet. Handl., 1859, 471, No. 3.

Gila River, Arizona, October (Dr. Oscar Loew). Previously known only from Mexico.

NEIDES, Latr.

NEIDES SPINOSUS, Say.

Neides spinosus, SAY, Am. Ent., i, pl. 14.

One specimen from Owen's Valley by F. Bischoff.

SCOLOPOCERUS, Uhler, gen. nov.

General features of *Dasycoris*, Dallas. Body oblong-ovate, depressed. Head subquadrate, a little wider than long, the anterior angles acuminate, the tylus vertical, blunt; eyes small, deeply seated, with the surface behind each elevated into a lobe. Antennæ very stout, cylindrical, almost of equal

thickness throughout, closely beset with acute granules, which form also a crown on the ends of the joints; the basal joint longer than the second, the third longest, fourth very short, conical at tip, having only the base granulose. Rostrum extending nearly to the intermediate coxæ. Pronotum narrowing anteriorly, a little longer than wide, the lateral margins bluntly elevated. Sternum deeply grooved, almost to the base of the metasternum. Scutellum scarcely longer than wide, the lateral margins feebly elevated. Legs short, the posterior pair placed wide apart. Basal joint of the posterior tarsi nearly as long as the second and apical united. Hemelytra,—costal margins parallel, let into the surface of the tergum, and leaving an elevated and wide connexivum each side; nervures of the membrane very numerous, irregular, and ramose. Osteoles situated behind and beyond the intermediate coxæ.

SCOLOPOCERUS SECUNDARIUS, Uhler, *sp. nov.*

PLATE XLII, FIG. 5.

Form similar to *Dasycoris pilicornis*, Burm.; fusco-testaceous, freckled with black and fuscous; both the upper and lower surface granulated with black and brown; beneath paler than above. Antennæ appearing black by reason of the close set granules. Head testaceous, beset with remote, round, black granules anteriorly and near the outer angles; ocelli red, set in round, black dots; elevations behind the eyes with a few black points. Gular surface whitish-testaceous, with coarse, irregular granulations, some of which, on the cheeks, form longitudinal series continuously with the bed of the antennæ. Rostrum extending to behind the middle of mesosternum, dark piceous, paler at base and at the ends of the joints; basal joint shorter than the head, second a very little longer than the apical one, third not more than one-half as long as the second. Pronotum dull rufo-testaceous, pitted with large and irregularly placed piceous punctures, and with granules in some of them; lateral margins sinuated and granulated, the submargin linearly depressed; middle line distinct to near the base, the intra-humeral submargin a little tumid. Scutellum pitted and granulated with piceous. Legs rather closely granulated with black on a dull testaceous ground, the granules forming two or three bands at base of tibiæ, and a broader one at

their apex; tarsi piceous, the upper side of the basal joint testaceous. Corium pitted with remote piceous varioles, some of which contain a central granule; the base and principal nervule with coarse piceous granules; membrane with densely ramose, brown nervules. Tergum dull orange-testaceous, the surface with fine piceous punctures, and the penultimate segment with a broad piceous indentation each side; the connexivum tumid on each of the four central segments, beset with dense and minute piceous granules. Venter paler, faintly ochreous, finely and irregularly punctured, but with rufous and piceous remote granules, which are coarser and coalesce near the sides, forming longitudinal irregular lines of spots.

Length, 7 millimeters; width across the humeri, 2 millimeters.

Collected in the vicinity of the Gila River, in Arizona, by Dr. Oscar Loew.

DASYCORIS, Dallas.

DASYCORIS HUMILIS, Uhler.

PLATE XLII, FIG. 8.

Dasycoris humilis, UHLER, U. S. Geol. Surv. Terr., 1872, 403.

A specimen of the curious short-winged form was collected by Dr. Oscar Loew near the Gila River in October.

AUFEIUS, Stål.

AUFEIUS IMPRESSICOLLIS, Stål.

Aufeius impressicollis, STÅL, Kongl. Svensk. Acad., ix, 222.

One specimen from the vicinity of the Gila River, collected by Dr. Oscar Loew.

LYGAEIDAE.

LYGAEUS, Fab.

LYGAEUS RECLIVATUS, Say.

1. *Lygæus reclivatus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 321.

From Owen's Valley, California (F. Bischoff), and from Fort Wingate, N. Mex., July 10; vicinity of Gila River (Dr. Oscar Loew); Goat's Peak (Dr. J. T. Rothrock) and from Cañon Chelle, September (G. M. Keasbey).

A species common in Arizona, Nevada, and California, but rare in the eastern parts of the United States.

LYGAEUS FACETUS, Say.

2. *Lygœus facetus*, SAY, Hemipt., New Harmony, 13, No. 2.

Collected in Owen's Valley, California, by F. Bischoff. These specimens are of the usual type, having the full complement of red on the pronotum.

LYGAEUS BICRUCIS, Say.

3. *Lygœus bicrucis*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 322, No. 2.

No specimens were actually brought in by the survey; but the species is not uncommon in New Mexico, Nevada, and other regions traversed by some of the collectors connected therewith.

NYSIUS, Dallas.

NYSIUS ANGUSTATUS, Uhler.

PLATE XLII, FIG. 1.

Nysius angustatus, UHLER, U. S. Geol. Surv. Montana, 1870, 406.

A very small, pale specimen is in the collection from Owen's Valley.

MEGALONOTUS, Fieb.

MEGALONOTUS SODALICIUS, Uhler, *sp. nov.*

PLATE XLII, FIG. 2.

Dull piceous black; form of *M. chiragra*, Fab. Sparingly clothed with minute golden pubescence, which is more dense on the venter, and almost absent from the prostethium. Head stout, very minutely densely shagreened. Antennæ rufous; the apical joint and sometimes the base and apex of the second joint piceous; the basal joint scarcely more than one-half the length of the head; second longest, a little longer than the fourth; third about two-thirds as long as the second. Rostrum rufo-flavous, reaching to the middle of the mesosternum; the apical joint piceous; the basal a little shorter than the head; second longest; third and fourth short, subequal. Pronotum almost one-fourth wider than long, indistinctly and very minutely scabrous; the lateral margins distinctly, but very narrowly reflexed throughout, pale piceous or testaceous, feebly sinuated behind the middle; the anterior angles bluntly rounded; the humeral angles prominent, testa-

ceous; the posterior margin sinuated, rufo-piceous. Scutellum almost flat, minutely scabrous and punctate, the apex sometimes piceous or testaceous. Legs rufous or rufo-testaceous; the coxal plates more or less piceous; anterior femora stout, armed beneath with five small piceous spines; bristles of the tibiæ and outer surface of the tarsi piceous. Pectus and venter obsoletely, minutely punctured and shagreened. Hemelytra dull testaceous, not densely, but distinctly, and somewhat closely punctured with piceous; the clavus black at base and on the outer margin; corium with the two principal nervures and a large spot extending outward from the inner angle of the tip black, membrane white, with a large blackish spot extending from the middle to the apex.

Length, 4 millimeters; humeral width, $1\frac{1}{2}$ millimeters.

Owen's Valley, California; Virginia City, Nev.; Oregon; and Texas.

LARGIDAE.

LARGUS, Hahn.

LARGUS CINCTUS, H. Schf.

Largus cinctus, H. Schf., Wanz. Ins., vii, 6, No. 683.

Collected by Dr. Oscar Loew in the vicinity of the Gila River, Arizona.

PHYTOCORIDAE.

MIRIS, Fab.

MIRIS INSTABILIS, *sp. nov.*

PLATE XLII, FIG. 9.

General aspect of *M. virens*, Linn.; green, greenish or pale testaceous, clothed with close, yellow pubescence. Head broad, conical, the apex a little upturned each side; both before and behind the eyes is a longitudinal blackish stripe; vertex densely pubescent, minutely, confluently punctured, with a bald spot near the base, in the center of which runs the short, longitudinal groove; antennæ robust, rufous, the basal joint sometimes greenish, a little longer than the head, densely clothed with long pubescence; eyes round and prominent, posteriorly placed in contact with the pronotum;

rostrum reaching to behind the intermediate coxæ. Pronotum convex behind, the surface finely, deeply, and partly confluently punctured; the lateral margins broadly sinuated and with the carinate edge sharply prominent; the lateral black vittæ of the head are continued to each side of the scutellum, and sometimes extend broadened along the hemelytra to the apex of the corium; anterior angles callous exteriorly; the lateral carina abbreviated before reaching to them; humeral angles slightly recurved behind; the median line distinct and paler; propleura coarsely, confluently punctured, crossed longitudinally by a slender brown or red line, which is continued interruptedly to near the apex of the venter; meso- and metapleura punctured on the disk. Hemelytra pale straw-yellow on the exterior margin, and also on the edge of the inner margin, minutely, closely punctured, pubescent; cuneus generally pale green; membrane hyaline, or tinged with brown, with the nervures rufous or pale brown, sometimes with a fuscous short streak extending beyond the nervure. Wings hyaline or faintly smoky and iridescent, with the nervures brown. Scutellum with finer punctures than the pronotum, those of the middle and base being sometimes fuscous; the median line pale and smooth. Tergum green or pale rufous; the disk more or less fuscous. Venter green or pale rufo-testaceous, invested with rather close, yellow, sericeous pubescence, usually with a slender vitta of interrupted red or fuscous lines against the impression bounding the connexivum. Legs green, pubescent, often having the tarsi and tibiæ rufous; the posterior femora usually with two rows of rufous or piceous dots on the upper surface, and two similar rows beneath; the nails and tip of joint next to them piceous.

Length, 6–7½ millimeters; width across the humeri, 1¾–2 millimeters.

Collected at Roaring Fork, Colorado, by Dr. J. T. Rothrock.

I had formerly accepted the determination of Dr. Harris in referring this species to *Miris dorsalis*, Say; but after having closely compared specimens from many parts of North America with his description, the discrepancies are too great to permit such a reference.

This species inhabits a large part of North America, and it may yet prove to be only the western form of the European *M. laevigatus*, Linn.

HADRONEMA, Uhler.

HADRONEMA MILITARIS, Uhler.

PLATE XLII, FIG. 12.

Hadronema militaris, UHLER, U. S. Geol. Surv. Montana, 1870, 412.

From Roaring Fork, Colorado, by Dr. J. T. Rothrock. It seems to be very widely distributed throughout the Territories west of the Mississippi basin, and extends across to the Pacific coast.

CALOCORIS, Fieber.

CALOCORIS PALMERII, Uhler.

PLATE XLII, FIG. 4.

1. *Calocoris palmerii*, UHLER, U. S. Geol. Surv. Montana, 1870, 410, No. 2.

A few varieties were collected near the Gila River in Arizona by Dr. Oscar Loew.

CALOCORIS SUPERBUS, *sp. nov.*

PLATE XLII, FIG. 3.

2. *Calocoris superbus*, UHLER, *sp. nov.*

Having the same form and general characters as *C. rapidus*, Say. It differs, however, in being bright scarlet; the rostrum extending only to the posterior line of the middle coxæ; the antennæ black, and having only the base of the third joint pale; the scutellum blood-red, with the lateral margin black; the clavus and inner margin broadly black; the areole of the membrane deeply infuscated; the pectus orange-red; and the middle line of the venter blackish. Legs black, but with pale yellowish coxæ. Tergum a little infuscated.

Length, $7\frac{1}{2}$ millimeters; breadth across the humeri, $2\frac{3}{4}$ millimeters. One female from Owen's Valley, California (F. Bischoff).

LOPIDEA, Uhler.

LOPIDEA MEDIA, Say.

Lopidea media, SAY, Heteropt. New Harmony, 22, No. 11.

One female of the usual variety was collected in Owen's Valley, California, by F. Bischoff.

LYGUS, Hahn.

LYGUS ANNEXUS, Uhler.

PLATE XLII, FIG. 10.

Lygus annexus, UHLER, U. S. Geol. Surv. Montana, 1870, 413, No. 2.

Very common as far east as to the Mississippi River in Minnesota.

A few specimens of the paler varieties were brought from Owen's Valley, California (F. Bischoff).

NABIDAE.

NABIS, Latr.

NABIS FERUS, Linn.

Nabis ferus, LINN., Fauna Suecica, 962.

One specimen from Owen's Valley, California (F. Bischoff).

ARADIDAE.

ARADUS, Fabr.

ARADUS AFFINIS, Kirby.

1. *Aradus affinis*, KIRBY, Fn. B.-Am., 279, No. 2.

From Owen's Valley, California (F. Bischoff).

ARADUS ACUTUS, Say.

2. *Aradus acutus*, SAY, Hemipt. New Harmony, 28, No. 2.

Two very pale specimens from Owen's Valley, California (F. Bischoff); also from Roaring Fork, Colorado (Dr. J. T. Rothrock). The eastern specimens are generally dark fuscous, while all that I have thus far examined from the region west of the Rocky Mountains have been more or less pale rust-brown.

PHYMATIDAE.

PHYMATA, Latr.

PHYMATA EROSA, Linn.

Phymata erosa, LINN., Syst. Nat., ed. xii, ii, 718.

A specimen of the ordinary type from Owen's Valley, collected by F. Bischoff.

SALDAE.

SALDA, Fab.

SALDA INTERSTITIALIS, Say.

Salda interstitialis, SAY, Jour. Acad. Nat. Sci., Phila., iv, 324.

From Roaring Fork, Colorado, collected by Dr. J. T. Rothrock.

HYDROMETRIDAE.

LIMNOPORUS, Stål.

LIMNOPORUS RUFOSCUTELLATUS, Latr.

Limnoporus rufoscutellatus, LATR., Genera Crust. et Ins., 134, No. 2.

"From stagnant water above the Rio Grande in Colorado" (Dr. J. T. Rothrock).

HYGROTRECHUS, Stål.

HYGROTRECHUS REMIGIS, Say.

Hygrotrechus remigis, SAY, Hemipt. New Harmony, 35, No. 2.

From Owen's Valley, California (F. Bischoff), and from Cañon Chelle, Arizona, in September (G. M. Keasbey).

NAUCORIDAE.

ABEDUS, Stål.

ABEDUS OVATUS, Stål.

Abedus ovatus, STÅL, Stettiner Ent. Zeit., xxiii, No. 341.

Collected by Dr. C. G. Newberry at Colorado Chiquito, July 30; by H. W. Henshaw, at Cave Spring, Ariz., July 31; by G. M. Keasbey, at Zuñi, N. Mex., in August; and in the Gila River, Arizona, October, by Dr. Oscar Loew.

ZAITHA, Amyot & Serv.

ZAITHA FUSCIVENTRIS, Dufour.

Zaitha fusciventris, DUFOUR, Ann. Soc. Ent. de France, ser. iv, iii, 389.

One specimen from Owen's Valley, California, by F. Bischoff. This species extends from Central America through Mexico and into New Mexico, California, and Texas.

NEPIDAE.

RANATRA, Fab.

RANATRA QUADRIDENTATA, Stål.

Ranatra quadridentata, STÅL., Ofversigt Kong. Vet. Akad. Förhandl., 1861, 204.

One specimen from Owen's Valley, California, by F. Bischoff. It corresponds exactly with specimens from Western Mexico.

NOTONECTIDAE.

NOTONECTA, Linn.

NOTONECTA INSULATA, Kirby.

Notonecta insulata, KIRBY, Fn. B.-Am., 285, No. 399.

Owen's Valley, California (F. Bischoff).

This species seems to extend entirely across the continent, north of the fortieth parallel, and on the Pacific side extends as far south as San Francisco

CORISIDAE.

CORISA, Geoff.

1. CORISA DISPERSA, *sp. nov.*

PLATE XLII, FIG. 7.

Pale dull testaceous, robust, lineated with dark brown. Head broad, the cheeks remotely, obsoletely punctured, an impressed line at the inner margin of the eyes coarsely punctured, and each side of the middle line of face with a series of coarse shallow punctures; occiput angularly produced, carinated, broadly impressed on each side. Eyes subtriangular, the inner angle rectangular. Pronotum broad, short, pale, having eight, or rarely nine, brown transverse lines, of which the three central ones are abbreviated and more slender; the surface minutely rastrated; the anterior margin emarginated, and with a very short carina just behind this; the posterior margin broadly rounded. Legs pale testaceous; the tip of the basal joint of the intermediate tarsi brown; palæ of the female falcate, acute at tip, almost as long as the femora; in the male, the anterior tibiæ are flattened, curved inward, and the palæ are very short, broad, placed obliquely, and of the form of an arrow head with the basal angles rounded. Hemelytra with slender transverse, undulated, interrupted, and tolerably

regular, brown lines; those of the base of the clavus straighter and almost obliterated, leaving a bare spot at base; the epipleura white, with the transverse nervure, the apical margin, and tip infuscated. Some of the basal and apical lines of the corium are often forked. Tergum black in the male; blackish, infuscated, margined with fuscous, or with only a fuscous tip, in the female. Venter either black, infuscated, or with only a fuscous tip. Facial fovea of the male broad and long, extending above the line of the eyes, densely clothed with long silvery hairs.

Length, 5–6 millimeters; width across the humeri, 1½–2 millimeters.

Brought from Owen's Valley, California (F. Bischoff). Specimens have also been collected near Virginia City, Nev., and in Texas.

The membrane usually has a dark spot at base on the outer margin, another on the inner margin, and sometimes one on the disk.

CORISA INTERRUPTA, Say.

2. *Corisa interrupta*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 328.

Collected in Owen's Valley by F. Bischoff, and at the Lower Rio Grande in October.

TETTIGONIDAE.

PROCONIA, Amyot & Serv.

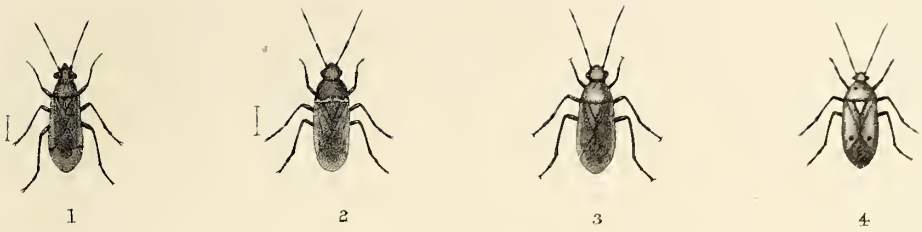
PROCONIA COSTALIS, Fab.

Proconia costalis, FAB., Syst. Rhyng., 96, No. 44.—SIGNORET, Ann. Soc. Ent. de France, 1854, 359, No. 210. pl. xii, f. 8.

Two damaged specimens of *Jassina* are in the bottle from Owen's Valley, but they are not in a recognizable condition.

It may be mentioned that this collection numbers many hundred specimens of the different species enumerated and described.

NOTE.—It is greatly to be regretted that the entire collection made by the expedition in 1872 was lost in transit from the National Museum to Prof. Uhler.



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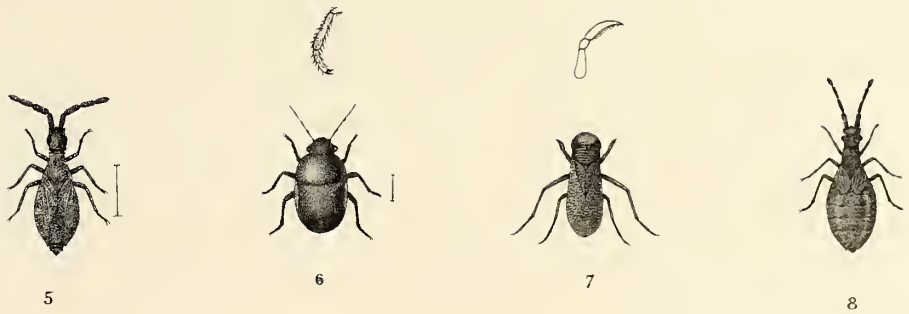

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FIG. 1. NYSIUS ANGUSTATUS.
FIG. 2. MEGALONOTUS SODALICIUS.
FIG. 3. CALOCORIS SUPERBUS.
FIG. 4. CALOCORIS PALMERII.
FIG 5. SCOLOPOCERUS SECUNDARIUS
FIG. 6. CORIMELÆNA EXTENSA.
FIG. 7. CORISA DISPERSA
FIG. 8. DASYCORIS HUMILIS
FIG 9 MIRIS INSTABILIS.
FIG 10 LYGUS ANNEXUS
FIG. 11 LIODERMA VIRIDICATA
FIG. 12. HADRONEMA MILITARIS

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CHAPTER XIII.

REPORT

UPON

THE COLLECTIONS OF ORTHOPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874.

BY

Prof. CYRUS THOMAS.

CHAPTER XIII.

Lieut. GEO. M. WHEELER, *Corps of Engineers, U. S. A.:*

DEAR SIR: The *Orthoptera* which you have submitted to me for examination includes your collections made during the explorations of 1871, 1872, 1873, and 1874. Those of first two years are comparatively small, but those of 1873 and 1874 are the most extensive I have seen from the West, and contain much of value and interest to foreign as well as our own orthopterists. Although the first is small, yet it contains several new species and also one new genus. This genus presents some very interesting features and peculiarities. In fact, so important was this deemed, that with your permission a description of it, as well as a few other new species of *Acrididæ*, was published in the Proceedings of the Philadelphia Academy of Sciences, in order that I might avail myself of this new material for publication in my "Synopsis of the Acrididæ of North America", which I desired to have as complete as possible for the use of our entomologists. You will see by an examination of my work that I have availed myself of your kind permission in this respect; nevertheless, as this material was obtained by your expedition, I have not only inserted the descriptions here in full, but have also added such remarks as I deemed of scientific interest.

This collection is of peculiar interest to me besides, for the following reasons: it contains a specimen in color, and a female of *Locusta fuliginosa*, Thos., which I described from a single male furnished by Dr. Palmer. As this was the first specimen of *Locusta* observed in the United States, I was very anxious to obtain the female, and, if possible, a specimen in color. This wish has been gratified by the receipt of your collection. Although some doubt was expressed at the time as to the correctness of my opinion as to

this being a different species from a specimen obtained in California, I am now able to set all doubts at rest, and state positively that the two are quite different and distinct species.

The collections of 1873 and 1874, as will be seen, contain a number of new and interesting species, especially of *Calopteni* and *Œdipodæ*, but it is somewhat singular that so few specimens of *Caloptenus spretus*, the destructive grasshopper of Utah and the West, are found in them. This certainly indicates that the line of your survey was along the southwestern border of its district. In fact, the collection of 1871 did not contain a single specimen, which was somewhat surprising to me, as I am aware from personal knowledge that its migrations extend along the line of the Central Pacific Railroad some distance west of Salt Lake.

The absence from the earlier collections of *Œdipoda atrox*, Scudd., which corresponds exactly with the fact presented by my own collections from Salt Lake north to Montana, is somewhat puzzling when connected with the additional fact that specimens of this species have been found on the mountains about Yellowstone Lake, and also on the mountains in Central Colorado. This species is found in abundance in California, where it is not only destructive, but to a certain extent migratory. It is therefore quite strange that it should be absent from the intermontane plains and valleys of Utah, Idaho, and Nevada, and yet be found in the higher mountain regions of Colorado and Wyoming. The same thing also appears to be true in regard to some other Californian forms, which reappear in the mountains of Colorado.

Your collection also corresponds in another somewhat singular respect with the collection I made in 1871 in Northern Utah and Southeastern Idaho. While the Rocky Mountain range appears to form a boundary to the range of the species of *Locustidæ*, on the other hand, the distribution of the *Acrididæ* appears to be but little affected by it; for example, *Stenobothrus coloradus*, which I supposed was confined to the eastern slope and eastern plains, I find in this collection. *Œdipoda neglecta*, which, although a western species, is found as far east as Illinois, is contained in your collection, as is also *Œ. cincta*, which reaches eastward to the Mississippi River.

Pedioscertetes nevadensis, which is very closely allied to *Acrolophitus*

hirtipes (the *Gryllus hirtipes* of Say), I judge is a southwestern form, which ranges chiefly south and west of the line of your survey, as I have seen it in no other collection. It is possible that Major Powell's collection, which I have not seen, may contain specimens of this interesting species.

Having pinned a number of your specimens by the side of a small collection from Southern California, I observed a somewhat singular contrast in color; the prevailing color of the *Calopteni* and *Œdipodæ* from California being a bright yellow, while the corresponding species of your collection were largely rufous. I have been inclined to believe, though not fully satisfied on the point, that, in the West, the general or ground color of species which inhabit barren spots, is, to a certain extent, dependent on the color of the surface soil.

I find also a specimen of *Œdipoda undulata*, Thos., which I supposed was confined to the section east of the Rocky Mountain range; but this collection shows that it also belongs to the middle or intermontane area. I find in the collections of both years a fine large *Acridium*, which is new, a description of which, by your permission, has been published, and is contained in my synopsis. But the most interesting object of the collection is a specimen of *Ephippigera tschivavensis*, Hald. I have expressed the opinion, in my synopsis, that Haldeman's specimen was the pupa of some species of *Œdipoda;* but a slight examination of this specimen is sufficient to show any entomologist that it is an imago, and that Haldeman was right in describing it as new. Other notes in regard to the collection will be found under the proper heading.

Since the publication of my Synopsis, I have received from Dr. C. Stål, of Sweden, a copy of his *Recensio Orthopterorum*, published about the same time, which introduces quite a number of changes in the arrangement of the groups of this order. As this author is the leading orthopterologist in Europe, I have thought it proper to call attention to such changes as relate to our Orthopteral fauna.

I have also received from Mr. Otto Hermann a copy of his paper on the *Decticidæ*, recently published in the *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft* in Wien, which contains a friendly criticism on my provisional arrangement of this group of the *Locustidæ*. As the

author had sufficient material before him (obtained chiefly from the collection of Dr. Brunner de Wattenwyl) to properly systematize this group, and clear up the confusion into which it had fallen, I have thought it proper to give here his arrangement for the benefit of our entomologists.

Allow me to state that your collection has been of much value to me in my investigations of this order, and that I trust the following brief report may be accepted as a partial attempt on my part to repay you for your kindness in submitting it to me.

I remain yours, very respectfully,

CYRUS THOMAS.

LIST AND DESCRIPTIONS.

The specimens of 1871, as I learn from the letters of Lieutenant Wheeler and Dr. W. J. Hoffman, as well as by personal communication of Dr. H. C. Yarrow, were collected chiefly along the route of the expedition, from Carlin, on the Central Pacific Railroad, to Cottonwood, in the southern part of Nevada; a small portion only of the collection being obtained in Northwestern Arizona. A portion of this collection is preserved in alcohol; others are dried specimens, which retain their colors.

The collections of 1872, 1873, and 1874 were made in Utah, Nevada, Colorado, New Mexico, and Arizona, by Dr. H. C. Yarrow, Dr. J. T. Rothrock, Dr. C. G. Newberry, Lieut. W. L. Marshall, Mr. H. W. Henshaw, and others of the expedition.

BLATTIDAE.

The absence of this family from western collections would seem to indicate at least that it was not well represented in that section. This also corresponds with my observations in the sections I have visited. I do not think I have seen a dozen specimens in all the collections I have examined. I do not find a single specimen in this collection.

MANTIDAE.

There are three specimens belonging to this family in the collection, one of which is new, and is named in honor of Lieutenant Wheeler, in charge of the expedition.

MANTIS, Linn.

MANTIS WHEELERII, *sp. nov.*

The specimen is dry, and is so badly damaged that it is impossible to determine positively the genus to which it belongs, or to do more than indicate some of its leading specific characters.

Female.—Head flat, transverse, triangular in front. Occiput short, reduced to a transverse ridge. Vertex transverse, directed downward and backward toward the face, with four slight longitudinal depressions. Ocelli distinct and prominent. The face transversely quadrilateral; the upper carinate margin bent upward between the antennæ. The antennæ wanting. Prothorax about twice the length of the rest of the thorax; the margins minutely serrate, slightly emarginate, scarcely expanding posteriorly, expanding near the transverse incision. Anterior femora denticulate on the exterior carina. Abdomen enlarged, fusiform. Middle and posterior legs wanting, and but a remnant of the wings remaining.

Color.—Yellow, probably faded from a pale green. The abdominal segments with a piceous black fascia or ring on the posterior margin of each. The remnants of the wings carneous-red.

It is probably a species of *Stagmatoptera;* but it certainly approaches very near to *Hierodula*, notwithstanding Saussure's assertion that those belonging to the genus are "*Insectes asiatiques et africains*".*

The specimen is too much injured to give any very accurate measurements; but the following approximations will indicate the size:—Length, 2.2 inches; prothorax, 1.0 inch; anterior femora, 0.5 inch; anterior tibiæ, 0.6 inch.

Stål (*Ofver. k. Vetensk.-Akad.*, 1871) gives a new arrangement of the *Mantidæ* in the form of a synoptical table. Although this possesses some advantages in tracing species, yet I prefer that of Saussure, as given in his *Mélanges orthopterologiques* (3me fas., 1870).

He divides the family into two divisions, which he terms *groups*, but which might very properly be called subfamilies. The first, *Nudipedes*, is distinguished by setaceous antennæ in the two sexes; head triangular, simple, without prolongations; feet and body simple, without membranous

* Melanges Orthopterologiques III, Fascic. 214.

appendages; elytra oval or lanceolate with entire borders. The second, *Lobipedes*, is distinguished chiefly by the appendages found on some part of the body or feet.

The former group is divided into two tribes, *Orthoderii* and *Mantii;* the former having the prothorax straight, the sides parallel, and the front not attenuate, while the latter has that portion of the prothorax over the anterior coxæ more or less expanded, and the front attenuate or convergent. The three species here mentioned belong to the latter tribe.

This tribe is separable into two divisions distinguished by the form of the super-anal plate; in the first (*Mantites*, Sauss.), it is transverse, or in the form of a short triangle; in the second (*Thespites*, Sauss.), it is elongate-triangular or lanceolate.

Saussure, in his synoptical table of the genera of the *Mantii*, groups the genera under the following headings:—

I. Super-anal plate transverse, or a short triangle .... *Mantites.*
  a. The discoidal vein of the wing of the ♂ ♀ undivided or furcate.
  aa. The discoidal vein of the wing of ♂ ramose:
    b. Species small; pronotum short.
    bb. Species large; pronotum more or less elongate; body robust; abdomen rhomboidal or fusiform or narrow:
      c. Elytra of the ♀ squæmiform.
      cc. Elytra and wings of the ♀ complete.

It is to this last subdivision, embracing some six or seven genera, that the species in this collection belong.

MANTIS ——— (?).

It is possible this is new; but as it bears a strong resemblance in some respects to *M. carolina*, I have not ventured to describe it as a new species from the single alcoholic specimen before me.

Female.—Elytra greenish-yellow, unspotted; stigma small, oblong, same color; extending to the margin of the penultimate segment of the abdomen. Wings similarly colored, with yellow interneural fasciæ; discoidal vein furcate. Stature that of *M. carolina.* These characters would appear to place it between *Cardioptera* and *Stagmatoptera;* it may belong to the southern form of *Stagmomantis carolina* which Saussure has separated as a distinct species, it is therefore impossible to determine accurately its position without the male.

MANTIS ——— (?).

This specimen is very much mutilated; the greater portion of the abdomen is wanting. It is possible that it is but the pupa of the previous species, to which it is evidently closely allied.

PHASMIDAE.

Two specimens of this family are contained in the collection, and, although not in a condition to be specifically determined, yet it is evident that they are quite distinct.

ACRIDIDAE.

INTRODUCTORY REMARKS.

Most of the specimens collected belong to this family, and are the most interesting on account of the new forms brought to light. I find in the collection no representatives of the group *Tryxalini*, as this group is limited in my Synopsis, nor have I seen any representative of it west of the Rocky Mountain range, except two or three larvæ of what I supposed to be a species of *Opomala*. So far as the number of species is concerned, the *Œdipodæ* appear to be more abundant than the *Acridii*.

As Stål's "*Recensio Orthopterorum*", heretofore mentioned, relates wholly to this family, I have concluded to introduce what I have to say in regard to it at this point. And first I may state that I am as yet unable to ascertain positively which has priority in date of publication, the "*Recensio*" or my *Synopsis*. The title page of the former bears date 1873, which is also the date of the latter. The author quotes his own paper published in *Öfv. Kongl. Vet. Akad.-Förhandl.*, No. 4, 1873. By reference to this paper, which, with the "*Recensio*" has been kindly communicated to me by the author, I find that it was presented April 16, 1873. As it is probable it was not published for a month or so after it was presented, I infer that the "*Recensio*", in which it is quoted, did not make its appearance until in the latter part of the year. My *Synopsis* was actually published (distributed) about the first of October, 1873. It is therefore a matter of doubt as to which has precedence in date of publication; and until this is settled by ascertaining the exact date of the publication of the "*Recensio*", I shall retain

the names I have adopted in that work where they relate to the same division, genus, or species, except where I find that I am in error.

It is proper to remark here that this work relates almost exclusively to the species named by Linné, De Geer, and Thunberg, yet the author seizes the occasion to present a somewhat detailed synopsis of his arrangement of the family. While I cannot agree in every respect with this arrangement, yet I think it must be admitted that he has made a marked advance in systematizing this troublesome family, and that entomologists must adopt much that he has presented.

Although I am inclined to think my own arrangement should be somewhat modified, I cannot adopt his division into eleven subfamilies, if they are intended to stand as divisions of equal value, or as representing corresponding variations. The grouping does not differ very materially from that of most recent authorities, although the characters used as his chief guides are somewhat different. This would indicate that the larger groups, as now established, are natural, as the same result is reached, no matter from what stand-point our investigations are made.

In my synopsis, I have divided the family into two primary divisions, which I call, and I think correctly, subfamilies, while the next divisions, corresponding, in part, with Stål's, I have termed groups. This method, I think, corresponds more closely with the nature of the characters that separate these divisions, and renders the arrangement more systematic than either that of Walker or Stål.

The subfamilies given by Dr. Stål are as follows:—

Phymatidæ;
Pamphagidæ;
Acridiidæ;
Truxalidæ;
Œdipodidæ;
Pneumoridæ;
Cœlopternidæ;
Tittigidæ;

arranged in the order here given; also *Proscopidæ*, *Mastacidæ*, and *Choræ-typidæ*, whose position in his system the author does not give.

Although the author, in his diagnoses of these groups, reveals the fact that the distinctions in one case are greater than those in another, yet so far as the arrangement and naming is concerned they stand as equivalents. No one will contend for a moment that the difference between *Acridium* and *Œdipoda* is as great as between either of these and *Proscopia* or *Tettix*. Yet Dr. Stål's system does not indicate this fact, as his groups stand as equivalents.

If we compare the true *Acridians*, as *Acridium*, *Œdipoda*, &c., with the *Tettigi*, we find the following differences:—

Acridii.—Of various sizes, from half an inch to four inches in length; wholly terrestrial in their habits.

Tarsi furnished with a pulvillus, or pad, between the claws; although sometimes minute, yet it is seldom, if ever, absent.

Pronotum consisting of a kind of shield, covering the prothorax and extending backward at farthest only upon the base of the elytra.

Prosternum drawn up; that is, it is not in the same plane as the rest of the sternum; spined, tuberculate or smooth, but never advanced upon the mouth.

Mouth free, not covered by the prosternum.

Elytra and *wings* generally present, but sometimes aborted or entirely wanting; but, when present, the latter never exceed the former in length.

But an examination of the *Tettigi* reveals an entirely different set of characters in all these respects, as may be seen from the following statement of them:—

Tettigi.—Generally of small size, many being less than half an inch in length, and seldom exceeding an inch, preferring moist damp situations, and in some cases even subaquatic.

Pronotum forming a shield over the entire body, extending backward nearly or quite to, and often beyond, the tip of the abdomen; sometimes flat, sometimes keeled and arched, and in some species elevated into a sharp foliaceous crest.

Tarsi without pulvilli, or pads, between the claws.

Prosternum depressed to the same plane as the rest of the sternum; advanced upon the mouth, and usually furnished with a kind of semicircu-

lar ridge, which forms a sort of muffler, into which the mouth is drawn when at rest.

Mouth covered by the advanced portion of the prosternum.

Elytra and *wings*, when present, generally placed upon the sides of the body, the latter exceeding the former in length; these organs being apparently pushed upon the sides by the extended pronotal shield.

These differences in the external structure, which all must admit are important, are accompanied by certain modifications of the internal structure, and certainly indicate important variations in habits.

Now, if we compare the species of Stål's subfamily *Acridiidæ* with those of his *Œdipodidæ*, or any other true Acridians, we shall find the tarsi in each case furnished with a pad between the claws; the shortened, shield-like pronotum; the prosternum drawn up; the mouth free; the elytra, when present, always equal to or exceeding the wings in length, and generally meeting or overlapping each other above the abdomen.

It is therefore clear that the true Acridians and the Tettigi are more widely separated from each other than the groups of the former; and a true arrangement ought to indicate this difference. For these reasons, I still hold that the Tettigi should be separated as a subfamily, and that the other groups of the true Acridians should be considered as subordinate divisions.

It will be observed that I have admitted that my arrangement should probably be somewhat modified; also, that, in speaking of certain groups, I have used the expression "True Acridians". My reason for this is that a more thorough examination of exotic forms has convinced me that the *Proscopiæ* constitute a distinct subfamily, equivalent to the Tettigi. Whether the *Mastacidæ* should be embraced in the same division as Stål in effect does in his Conspectus of his subfamilies, I am unable to say; but I have considerable doubt as to the propriety of this course.

A single glance at a typical species of *Proscopia* is sufficient to reveal even to a superficial observer important variations from the true Acridian type. Their elongate, cylindrical bodies, long, slender legs, and general appearance would lead us, at the first glance, as it did Stoll, to place them among the apterous *Phasmæ*. In fact, *Cephalocœma subaptera*, West (Arcan. Ent., ii, 55, pl. 63, fig. 2), might easily be taken by the unscientific

observer for our common *Diapheromera Sayi*. Not only is the body elongate, slender, and somewhat cylindrical, but is generally almost uniform in size throughout its length, and usually wingless. The head is elongate-conical, and either ascending obliquely (*Proscopia*), or extending forward horizontally (*Cephalocœma*); antennæ very short, often falling short of the tip of the vertex, and composed of but few joints (six to nine). The legs are quite slender; the posterior pair being scarcely fitted for leaping. The prothorax is very long, slender, and subcylindrical, having no pronotum in the sense of a shield, as seen in the true Acridians; the pronotum here being simply the dorsal portion of the prothorax as in the *Phasmæ*; the anterior legs (in *Proscopiæ*) are attached to the sides near the middle. The mesothorax and metathorax are very short; their combined length seldom equaling one-half the length of the prothorax.

It is evident from these characters, and others which might be named, that the distinctions between this group and the true *Acridii* are much greater than those which separate the groups into which the latter have been divided. I am therefore inclined to think this group should be considered as a subfamily, and as equivalent to the *Tettigi*. We should, then, have three subfamilies, as follows:—

PROSCOPINÆ, ACRIDINÆ, and TETTIGINÆ.

Therefore, while I think the arrangement given in my synopsis should be thus modified, on the other hand, the reasons which lead me to this conclusion would also lead me to reject the plan suggested by Dr. Stål, if his larger groups are to be considered as subfamilies.

Raising his *Proscopidæ* and *Tettigidæ* to subfamilies, and considering the rest of the family as a third subfamily, I am prepared to accept, in great part, his other groups, if considered as inferior divisions.

I most heartily agree with him in suppressing Walker's *Trigonopterygidæ*, and in raising *Pneumoræ* to a distinct group, as equivalent to *Acridini* and *Œdipodini*. And, to show that I had arrived at this conclusion before the receipt of the "*Recensio*", I quote the following from my notes prepared during the winter of 1873–'74:—

"This singular group (*Pneumoræ*) presents some very singular features,

&c. . . . . Although these divarications from the typical form are considerable, and possibly may require their separation into a distinct group, as I have used the term in my classification, yet I do not think they will justify raising the division to the dignity of a subfamily."

In regard to the *Trigonopterygi*, I quote the following from the same notes:—

"*Trigonopteryx* has a conical, somewhat ascending head; an oblique but incurved face, and ensiform antennæ, and if the wings were of the usual form would doubtless be placed in this group (*Tryxalini*) by all entomologists. The same remark may be made in regard to *Hyalopteryx*, Charp. If we place the former in a separate group, or limited family, as has been done by Walker, and in which I have followed him improperly in my Synopsis, on account of the unusual elytra, how shall we avoid the necessity of forming a separate group for *Sphenarium*, which has but figments of elytra, unusual in form and neuration, attached to the sides of the thorax? *Trigonopteryx* is essentially tryxalidian in form and features, and should be included in this group (*Tryxalini*); therefore I feel compelled to correct my former work in this respect."

Notwithstanding Dr. Brunner Wattenwyl approves of the character chosen, which forms the chief ground for separating the *Phymatidæ* from *Pamphagidæ*, yet I doubt the propriety of forming two divisions. Placing *Mastax* in a separate group or division is certainly correct. I know nothing in regard to the species on which he bases his subfamilies *Cœlopternidæ* and *Chorœtypidæ*.

Before speaking of the genera which the author embraces in his subfamilies, I desire to call attention to the order in which he arranges these subfamilies, which has been given on a previous page. The author does not state positively that this is the order in which they should stand; but it is the order in which they are placed in the body of his work.

In his Conspectus, they stand in the same order, *Proscopidæ* standing at the head; *Mastacidæ* second; and, then, as given, down to *Pneumoridæ*; then follows *Chorœtypidæ;* after that the other two as given. As the order in the body of the work, so far as given, corresponds with that in the Conspectus, it is probable that this forms a correct outline of his arrangement.

It is evident that by this arrangement the groups, with perhaps two exceptions, form as close connections on each side as is possible; for example, the connection of *Acrididæ* with *Truxalidæ* is natural, as is that of the latter with *Œdipodidæ*.

By reference to my Synopsis (page 144), it will be seen that I also maintain this bilateral connection of the *Tryxalides*, placing *Xiphocera* on the side next the *Acridii* as the connecting link. But I there place the *Tryxalides* at the head, and the others as the parallel links of two descending or ascending lines.

If Stål intends *Proscopidæ* to stand before *Phymatidæ* as the connecting link between this family and *Phasmidæ*, and he can scarcely do otherwise, then his arrangement will be somewhat in the form of a recurring series: beginning with the elongate conical head and slender form in *Proscopia*, he passes through the gradually shortening and swelling forms of the *Phymatidæ*, to the large lubberly *Pamphagus elephas*, which, by its size and unwieldy appearance, reminds us strongly of the *Brachypeplus magnus* of our western plains. When he reaches his *Truxalidæ*, he again has the conical head and slender body, which again recedes from view when he enters the *Œdipodidæ*. It is evident therefore that this linear arrangement depending on one or two characters, no matter how permanent, is not in accordance with nature. There are evidently diverging lines, and Dr. Stål's work has rendered it quite probable that there are three of these lines instead of two, as I have given; and this also increases the evidence in favor of Dr. Scudder's idea as to the ascending order of the families, as it indicates the conic head and slender form as the more generalized, as it is the converging point of three different lines. While I am compelled to admit these facts as against my view as to the position in the scale of being, yet it but increases the difficulty at the other extremity of the family.

I am satisfied that no arrangement can stand the test of future investigations which separates the *Proscopiæ* and *Tryxalidæ* so widely as Dr. Stål has done, no matter how satisfactory it may be in other respects. While I am fully conscious of the difficulties experienced in attempting to arrange the subdivisions in a continuous line, at the same time I consider it very doubtful whether success in this respect is advantageous or in accord-

ance with nature, if, while harmonizing the parts of a group with each other, we tear asunder the links which bind it as a whole to other adjacent groups. Moreover, I believe it is now generally conceded that, in ascending the scale of being, we pass, as a general rule, from the generalized to the specialized, and find the lines we are tracing repeatedly branching and forming other lines.

Without attempting at present a further review of the author's general arrangement, I will call attention to such changes in his work as relate to our North American orthopteral fauna.

Sphenarium, *Ichthydion*, and *Pyrgomorpha* are transferred to *Phymatidæ*.

The last named genus as he has limited it, and in fact the characters of this subfamily as he has given them, excludes our *P. brevicornis*, which, as will hereafter be seen, has been retained in *Truxalis*.*

His subfamily *Acridiidæ* includes the following genera, which have usually been placed in other divisions:—*Xiphocera*, *Tropinotus*, *Dictyophorus*, *Rhomalea*, *Mesops*, and *Opsomala*.

Our *Rhomalea centurio* (*microptera*) is retained in the *Dictyophorus* of Thunberg as *D. reticulatus*, the name given to it by that author in 1815. This genus, as now limited, is distinguished by the following characters:—The vertex and fastigium lying in the same plane and slightly declined, and seen from the side forming a right angle with the frontal costa; pronotum obtusely carinated; anterior margin forming an obtuse angle or rounded.

Rhomalea is limited to the species possessing the following characters:—The transverse impressions of the pronotum distinct; anterior lobe destitute of a carina; posterior lobe depressed, but ascending posteriorly; frontal costa suddenly flattened below the ocellus. In this, he places *R. miles*, Burm., but restores the specific name *speciosa* of Thunberg; *Acridium coloratum*, Serv. (*Chromacris colorata*, Walk.), is also included. His specimen of the latter species is from Mexico; it is therefore probable that the locality (Carolina) given by Serville for his specimen is a mistake.

The author also introduces a new genus (*Tæniopoda*) into this rhomalean group, which has the following as its distinguishing characters:—Fastigium strongly deflexed, forming with the frontal costa as seen from the side

* The reader will notice that, in speaking of Stål's genera and subfamilies, I retain his method of spelling.

an obtuse, somewhat rounded, angle; pronotum cristate, the crista on each lobe near the posterior sulcus depressed.

This includes the *R. equita*, Burm., *Monachidium superbum*, Stål, and *R. pecticornis*, Walk. Stål describes the last named species as new under the name *T. picticornis*. This collection contains several specimens of this fine species, which will be noticed at the proper place.

Stål's division of this heterogeneous group into different genera is eminently proper; for a single glance at *R. microptera* and *R. miles* is sufficient to convince any entomologist that they are generically distinct. As the *Dictyophorus* of Thunberg has precedence in date, its restoration must be acquiesced in.

The *Lophacris* of Scudder is included under his *Titanacris*, which the author distinguishes from *Tropidacris* chiefly by the venation of the elytra and form of the genital plate of the male; being entire in the former and emarginate in the latter.

At this point, a new genus (*Hermistria*) is introduced, founded on a species from Mexico. This and the other new North American species mentioned will be noticed in this paper at the proper places.

The change which, if followed, will produce greatest confusion in our American nomenclature is that in reference to the caloptenoid species. He holds, as I learn by letter from Dr. Brunner de Wattenwyl, that we have no *Calopteni* in North America; all our species being referable to *Pezotettix*. Serville's name (*Calliptamus*) is amended and retained as *Calliptenus*. The chief distinctions given by the author between this genus and *Pezotettix* are as follows:—

In *Calliptenus*, the elytra destitute of the intercalate vein; the posterior femora broad and distinctly serrate above; the posterior sulcus of the pronotum in the middle or before the middle.

In *Pezotettix*, the elytra abbreviated or rudimentary, and furnished with an intercalate vein; posterior femora having the upper margin entire and unarmed; posterior sulcus of the pronotum sometimes situated behind the middle.

His numerous divisions of these restricted genera into subgenera show clearly the difficulty experienced in attempting to obtain a satisfactory

arrangement. It is clear that if we follow the diagnoses of these genera as given by him, all of our *Calopteni* will have to be removed to other genera. *C. femur-rubrum* is placed in *Pezotettix* under the subgenus *Melanoplus*, and, as a matter of course, must carry with it *C. spretus*, and other closely allied and congeneric species. Stål is undoubtedly correct in subdividing Serville's genus, as that author, in his *Histoire des orthoptères*, recognizes two quite distinct groups. But the question arises here as to which subdivision the name should be applied. The genus was formed by the author, and first used by him in his *Revue méthodique des orthoptères* (1831) for the reception of three species, *C. italicus*, *morio*, and *sanguinipes*. It is true that afterward (1839), in his *Histoire des orthoptères*, Serville removed *C. morio* to *Ædipoda*, as it was in fact no Acridian, and had been previously named by Creutz (Entom. Versch.); also that he returned *C. sanguinipes* to *Acridium*, thus leaving *C. italicus* as the only original representative of his genus. But, in the mean time, Burmeister* changes the name to *Caloptenus*, and includes in the genus, as limited and understood by him, not only *italicus*, but also the American species *femur-rubrum*, *femoratus*, and *bivittatus*, besides a number of other exotic species. If Serville's name was erroneous, then Burmeister was as fully authorized to correct it as Dr. Stål, and it comes from the hand of either really a new genus. But not only this: Serville includes three species which are incongruous, each of which had been previously named, and two of which he afterward, in his *Histoire des orthoptères*, removes. Stål speaks of this contention in regard to priority as puerile and derogatory to science; yet he clings to the name given by Serville, although it is erroneous and has to be emended, making *C. italicus* the type.

Under these circumstances, and following out the spirit of his own advice, as given in his introductory remarks, I shall not follow him in this respect, because I do not think even the strictest construction of the law of priority requires it, and because to do so would inflict upon our nomenclature a host of synonyms which can be avoided by retaining the name *Caloptenus*, as given by Burmeister. Some of the species may have to be removed to other genera. It is true that the peculiar characters selected

* I am aware that some doubt as to priority in date of the *Handbuch der Entomologie* and *Histoire des orthoptères* has recently been expressed; but so long as it is generally conceded to the former, our conclusions in regard to nomenclature must be based upon that assumption.

by Dr. Stål may map the ground into areas whose lines fall wide of those heretofore given; but before we follow this, we must be convinced that his characters group according to nature. Dr. Gill, if I recollect rightly, remarks, in the introduction to his arrangement of the Fishes, that a character or series of characters which may be used in one group or even part of it as a correct guide may fail to indicate the true relation of species at another point. Dr. Stål is doubtless fully aware of this fact; but it appears to me he has neglected at some points to act upon it, and has maintained his plan somewhat arbitrarily. Still I do not feel authorized to take direct issue with him without further opportunity for examination, but simply wish to be understood as saying that the change his arrangement requires in the group now under consideration is too great to be made without better reasons shown than those presented in his work.

Opsomala, Serv. (*Opomala*, Scudd.), is torn into fragments, and scattered hither and yonder. *O. filiformis* and *O. marginicollis*, Serv., are placed in a new genus, *Leptysma*, belonging to *Acridiidæ*, which has no marked or prominent character to distinguish it; that of the head being longer than the pronotum forming one of the principal features. But those who have paid any attention to this group know how unsatisfactory this character is.

A new genus, *Arnilia*, is established by the author for the reception of his *O. cylindrodes*, with which he places two specimens from Carolina. The latter, I presume, belong to *Stenacris chlorizans*, Walk. (*Mesops chlorizans*, Thos.).

O. bivittata, as Dr. Stål informs me by letter, is probably his *Mermiria Belfragii*, a new genus belonging to his *Truxalidæ*, and a species from Texas, which he has described as new; but his description leaves it doubtful whether he is correct in this opinion.

The following changes occur in *Truxalidæ*:—*Oxycoryphus*, *Gomphocerus*, *Stetheophyma*, *Stauronotus*, and *Epacromia* are transferred to this division. So far as this change relates to *Oxycoryphus*, *Gomphocerus*, and *Epacromia*, I can heartily approve of it, and I find, by reference to my notes heretofore mentioned, that I have already transferred *Oxycoryphus*, *Pedioscertetes*, and *Chrysochraon* to *Tryxalini*.

The old name *Acrida* of Linnæus is restored for the typical *Truxalides*

and *Truxalis* is retained in the Fabrician sense with *T. brevicornis* (our *Pyrgomorpha brevicornis*) as its type. If these old names, which have been so long ignored, are now to be restored, then Stål is correct in replacing *Acrida;* and, although I doubt the expediency of such a course, yet, as the law of priority justifies him, entomologists will probably accept the change. But if this rule is to be rigidly enforced, what excuse has he to render for utterly ignoring Walker's new genera and species where he is correct?

Stål describes as new Scudder's *Chloëaltis viridis* under the name *Truxalis angusticornis.* He describes a new species of *Achurum* from Mexico, and informs me that he thinks my *Tryxalis brevipennis* belongs to the same genus. I think it very probable he is correct in this. Saussure's *Oxycoryphus montezuma* is transferred to a new genus, *Syrbula,* in which is also placed a new Texan species. *Stenobothrus* is wholly ignored, and *Gomphocerus,* which he appears to have used in *Freg. Eug. Resa,* in the sense in which it is used by Borck, is here scattered among a number of new genera. He gives *Stetheophyma,* Fisch., *Arcyptera,* Serv., *Chrysochraon,* Fisch., and *Gomphocerus,* Thunb., as synonyms.

Stenobothrus viatorius, Sauss., is removed to a new genus, *Scyllina,* which has for its chief character the inequality in length of the spines of the posterior tibiæ.

In *Œdipodidæ,* the following changes are worthy of notice, and are of interest to American entomologists. *Tragocephala* of Harris is retained with *T. viridi-fasciata* as the type; and *Œ. sordida,* Burm., and *Œ. costalis,* Scudd., are transferred to it. *Tomonotus* of Saussure is ignored, and a new genus, *Arphia,* established for the reception of the following species found in the United States:—*T. sulphureus* and *T. tenebrosus;* the latter being described as a new species under the name *A. sanguinaria.* I can see no possible excuse for this new genus, which corresponds very closely in its characters with those given by Saussure, and especially as given in my Synopsis. If the *Acrida* of Linnæus and *Calliptenus* of Serville are to be retained at every sacrifice of convenience, why is it that the genera established by living authors are treated so cavalierly? There is no more reason why a Linnæan or Thunbergian genus should be retained than one established by a living author. In this case, I think Stål's apparent desire to furnish new names to

science has carried him a step too far, and, as I think he is wrong here, I cannot follow him.

A new genus, *Camnula*, is established for the reception of a species from Vancouver's Island. This species, which the author says is very similar to *Tragocephala sordida*, I am inclined to believe is my *Tr. pacifica*.

Œ. discoidea, Serv., is removed to *Hippiscus*. This change I can readily concur in.

Œdipoda is very properly restricted to but a small portion of the heterogeneous mass which has been thrown into it, for which entomologists have reason to thank the author. Our *Œ. Carolina* is retained, and appears to be his typical genus; this retains *Œ. trifasciata*, Say, and *Œ. undulata*, Thos. A new species from Illinois is described under the name *Œ. Belfragii*, which is probably my *Œ. cincta*. A new species from Mexico, *Œ. punctata*, is also described. *Œ. fenestralis*, Serv., is removed to a new genus, *Psinidia*, in which also two new species from Texas are placed.

Œ. maratima, Harr., is removed to *Tremerotropus*, also a new genus.

No important change appears to have been made in the *Tettigidæ*.

Although the author of this work has made a number of changes which I do not think entomologists can accept, as well as some which appear to be unnecessary, yet it must be admitted that he has rendered an important service to science in splitting up some of the heterogeneous and unwieldy genera as *Œdipoda*, &c., and especially in properly determining and locating the Linnæan, De Geerian, and Thunbergian species from an examination of the specimens. It is to be regretted that, while he has such scrupulous regard for the generic names of Linné, De Geer, and Thunberg, he should occasionally fail to give the proper credit to modern authors, wholly ignoring, as he states to me in a letter, the work of Walker, as this will necessitate a change by some future orthopterologist. It is true the catalogue of Walker is of but little value; yet, so far as it is correct, it should be accepted, no matter how much chaff surrounds the wheat.

Accepting this author's changes in the larger groups so far as I consider them correct, and making the modifications I have suggested, my arrangement of the divisions of the family would then be as follows:—

I. Subfamily PROSCOPINÆ.

1. Group *Proscopini.*

2. Group (*Mastacini*).

II. Subfamily ACRIDINÆ.

Division 1.—CONOCEPHALIDES.

3. Group *Tryxalini.*

Division 2.—ORTHOCERIDES.

4. Group *Œdipodini.*

5. Group *Acridini.*

Division 3.—XIPHOCERIDES.

6. Group *Phymatini.*

7. Group *Pamphagini.*

Division 4. (———?.)

8. Group *Pneumorini.*

9. Group (*Chorœtypini*).

10. Group (*Cœlopternini*).

III. Subfamily TETTIGINAE.

11. Group *Tettigini.*

Those included in parentheses are introduced provisionally, as I am unacquainted with the species forming them. So far as I am aware, only the third, fourth, fifth, sixth, and eleventh groups are represented in the North American fauna.

In connection with the list of the species found in the collection under examination, I will give short descriptions of the new North American genera and species described by Stål, and also give the new positions of some of the hitherto described species, under the foregoing modifications.

Subfamily ACRIDINAE.

TRYXALINI.

I cannot, with my present knowledge of the genera, accept Stål's removal of *Mesops* and *Opomala* from this group. It is probable that the species I have placed in *Mesops* may have to be removed to other genera, and the name retained for other species which belong elsewhere. I shall also transfer to this group *Oxycoryphus*, *Acrolophitus*, *Pedioscertetes*, *Chrysochraon*, *Stenobothrus*, and *Gomphocerus* (the two latter should probably be united into one genus).

TRYXALIS.

TRYXALIS BREVIPENNIS, Thos.

Tryxalis brevipennis, Thos., Synop., 58.

This, I presume, will have to be removed to *Achurum*, and will then become *Achurum brevipenne*.

TRYXALIS BREVICORNIS, Linn.

Grillus brevicornis, Linn., Cent. Ins., 1763, 15, 37.
Acrydium ensicornu, De Geer, Mém., 1773, iii, 499, 16, pl. 42, f. 7.
Tryxalis brevicornis, Burm., Handb. Ent., 1838, ii, ii, 607, 3.
Pyrgomorpha brevicornis, Walk., Cat. Dermap. Salt., 1870, iii, 500.

Stål's restoration of *Acrida* for the typical *Tryxalidæ*, and retention of *Tryxalis* for its earliest signification, will restore this species to the position assigned it by Fabricius. He has also identified De Geer's *A. ensicornu* with this species by an examination of the original specimen. I have determined, beyond any reasonable doubt, that the *Tr. notochlorus*, of Pal. Beauv. is the male of this species.

My *P. punctipennis* (Synop., 68) is but the female of this species; consequently this name will have to be suppressed.

ACHURUM.

This genus should now precede *Tryxalis* in a linear arrangement.

The following new species from Mexico is described by Stål:

ACHURUM ACRIDODES, Stål.

Achurum acridodes, Stål., Recens. Orthop., 1873, 101.
Truxalis acridodes, Stål., Öfv. Vet. Ak. Förh., 1873, xxx, 4, 52, 1.

Fusco-testaceous; vertex, dorsum of the pronotum, and anal area of the elytra greenish; cheeks and lateral lobes of the pronotum near the dorsum obscure; elytra griseo-hyaline, except the anal area, which is veined with fuscous; wings dusky. ♂, length, 27 millimeters.

Closely allied to *A. Sumichrasti*, Sauss., but differs in the color of the dorsum of the pronotum, and in the dorsum not being alutaceo-rugose, but on the front and posterior lobe is obsoletely punctate, and the lateral lobes being obsoletely variolose. Elytra a little shorter than the body, more than twice the length of the posterior femora; anal and axillary veins free.

Posterior femora not extending to the tip of the abdomen. Antennæ slightly narrowed at the apex, extending beyond the tip of the pronotum. Genital segment of the male elongate and acuminate.

MERMIRIA, Stål.

This new genus is introduced here, and the description copied from the *Recensio*, as the single species described under it is the one to which Stål is disposed to refer *Opomala bivittata*.

Generic characters.—Posterior tibiæ armed with numerous spines; those on the exterior margin numbering from eighteen to twenty-two. Head equal to, or but little shorter than, the pronotum; fastigium prominent; the frontal tempora (lateral foveolæ, or spaces of the vertex) not or but obsoletely separated. Base of the very obtuse (subtruncate) anterior lobe not shorter than the posterior. Elytra and wings not so long, or but slightly passing the apex of the abdomen; apex rounded. Frontal costa flat; margins sometimes subcallous. Antennæ ensiform; prosternal tubercle obtuse, distinct, strongly elevated in the middle; eyes shorter than the portion of the cheeks below them.

MERMIRIA BELFRAGII, Stål.

Mermiria Belfragii, Stål, Recens. Orthop., 1873, 102.

Pale olive-green. Head greenish-white; median carina of the pronotum and an interior vitta of the lateral lobes fuscous; the lateral carinæ pale. Elytra griseo-hyaline, greenish externally and yellow-veined internally; anal and axillary veins pale. Wings near the base pale greenish-yellow, near the apex fuscous-veined. Spines of the posterior tibiæ black at the tips.

♂.—Length, 44 millimeters. Texas.

A vitta on the cheeks behind the eyes pale fuscous; two olive-green lines on the vertex; fastigium narrow in front, rounded at the apex, slightly impressed near the margins, shorter than the eyes. The portion of the cheeks below the eyes somewhat longer than the eyes. Face obsoletely and frontal costa distinctly punctate. Antennæ broadly ensiform, somewhat narrowed at the apex, as long as the head and pronotum. Pronotum, or the dorsum, slightly convex transversely; lateral margins parallel; the

front and the posterior lobe punctulate; this lobe shorter than the front lobe; lateral lobes anteriorly and posteriorly punctate. Elytra extending to the apex of the posterior femora; apex very slightly narrowed and subrotund; the anal and axillary veins connect not far from the base. Posterior femora extend somewhat beyond the apex of the abdomen.

PEDIOSCERTETES, nov. gen.

Pedioscertetes, published in Proc. Acad. Nat. Sci. Phila., 1873, by permission.

Occiput somewhat ascending; vertex rises obliquely in front of the eyes in the form of a triangular pyramid. The dorsum of the pronotum and head as seen from the side taken together form a regular curve from the posterior extremity of the one to the tip of the other, the concave side being upward The vertex as seen from above is triangular, convex above; no median or lateral foveolæ; the tempora represented only by a slight depression on the deflexed margin. Frontal costa distinct above the ocellus, fading below; face subóblique and slightly incurved. Pronotum regularly expanding posteriorly, subtricarinate, the front lobes being rounded so as to render the lateral carinæ nearly obsolete; median carina absent or but a minute line; front margin truncate; hind margin rounded; the three transverse impressions distinct, close together, and occupying the second fourth, the posterior sulcus being about the middle. Elytra and wings normal, extending a little beyond the tip of the abdomen. Posterior femora slender, but slightly enlarged at the base; upper and lower carinæ slight, entire, unarmed, not quite reaching the tip of the abdomen in the female; tibiæ fully as long as the fermora; spines not very numerous; first joint of the posterior tarsi as long as the other two. Metasternum broad; prosternum narrow, unspined.

PEDIOSCERTETES NEVADENSIS, *sp. nov.*

PLATE XLIII, FIG. 4.

Pedioscertetes nevadensis, Ext. Pub. in Proc. Acad. Nat. Sci. Phila., by permission.

The tip of the vertex is separated from the portion between the eyes by a shallow, curved, transverse sulcus, which runs from the upper canthus of one eye to that of the other; the portion in front of the eye not quite as

long as the eye, acute-angled, flat or very slightly convex above. Frontal costa prominent and narrow between the eyes and slightly sulcate, fading suddenly below the ocellus or broadly expanding and becoming obsolete; lateral carinæ indistinct and subparallel.

Eyes oblong-ovate, subreniform, oblique. Antennæ large, filiform, slightly depressed, and extending to the second abdominal segment (♀). Pronotum subselliform; front lobes rounded and subcylindrical; the posterior lobe distinctly tricarinate; sides flat and slightly expanding posteriorly; posterior portion of the dorsum slightly elevated; the intercostal spaces flat, but slightly raised at the median carina; the median carina is but an indistinct line; the three transverse impressions distinct, but not profound, the posterior one placed slightly behind the middle; the posterior margin regularly rounded, nearly semi-circular; the posterior lateral margin curves inward at the humerus, but makes no angle; the posterior lobe is distinctly broader than the head. Elytra of moderate width; lower (anterior) margin slightly arcuate; wings rather narrow; both extend slightly beyond the abdomen. The abdomen comparatively enlarged and rather deep at the base; the valves of the ovipositor slender and acute. The body and legs hairy.

Color (after immersion in alcohol).—Dull greenish-yellow, showing clearly that the original color was green, probably light pea-green, as the closely allied species *Acrolophitus hirtipes*. This appears to have been the uniform color of the insect, the elytra being unspotted; there is a slight rufous tinge on the posterior part of the pronotum and base of the elytra; the apical portion of the latter is translucent. Wings pale yellow at the base, probably a transparent greenish-yellow when living; a moderately broad fuscous band across the disk; apex transparent, with dark nerves. Spines of the posterior tibiæ very slightly or not at all tipped with black.

♀.—Length, 1.25 inches; elytra, 0.80 inch; posterior femora, 0.60 inch; posterior tibiæ, 0.63 inch; pronotum, 0.25 inch.

Remarks.—This very interesting species, so far as I am aware, has been found in no collections except those made by this expedition. I find it marked as from Nevada, and, as it has been seen by no other collectors, I presume it must have been taken in the extreme southwestern limit of the

second expedition. It is evidently closely allied to the *Acrolophitus hirtipes*, Say, although the elevated pronotal crest and acute posterior pronotal margin of the latter place the two in different genera.

Professor Cope has somewhere remarked that specific characters may be carried over from one genus to another. If he is correct in this opinion, this would appear to be a case in point, for the similarity in the specific characters of this species and *A. hirtipes* is apparent to the most superficial observer. The figure of this species is copied from one engraved by Professor Glover.

By permission of Lieutenant Wheeler, a description of this new genus and species was published in the Proceedings of the Academy of Natural Sciences of Philadelphia, from which it was copied into my Synopsis. As it was given there really as an extract from this paper, it is given here as new.

SYRBULA.

This is another of Stål's new genera in which he places a new North American species. I insert his short description of the genus.

Similar to *Mermiria*, except as follows:—Antennæ slender, filiform, slightly dilated toward the apex; eyes longer than the portion of the cheeks below them; prosternum destitute of a spine; posterior lobe of the pronotum strongly punctate, rugulose.

SYRBULA MONTEZUMA, Sauss.

This is the *Oxycoryphus montezuma* of Sauss. transferred.

SYRBULA LEUCOCERA, Stål.

Syrbula leucocera, STÅL, Recens., 1873, 102.

Very similar to the *S. montezuma*, green changing into testaceous gray; the cheeks and lateral lobes of the pronotum obscure fuscous; an oblique vitta of the cheeks, margin of the mandibles, the entire broad exterior margin, and a narrow abbreviated interior margin and two abbreviated longitudinal lines of the lateral lobes of the pronotum pale. Elytra griseo-hyaline, sprinkled with fuscous; veins reddish or fusco-ferruginous; an anterior intercostal, ferruginous, opaque vitta. Posterior femora with three exterior fuscous spots; posterior tibiæ fuscous at the base, with a broad

pale ring near the base. Wings very slightly fuscous. Genital segment elongate, acuminate; cerci slender, but not acute.

♂.—Length 25 millimeters. Texas.

Posterior lobe of the pronotum very distinctly punctate and rugulose.

SYRBULA FUSCO-VITTATA, *sp. nov.*

PLATE XLIII, FIG. 5.

Male.—Antennæ a little longer than the head and thorax, filiform; apical half somewhat enlarged, acuminate at the apex. Top of the head about as long as the pronotum, slightly ascending, tricarinate. Vertex short, horizontal; margins slightly elevated, rounded somewhat acutely at the front; tempora almost or quite obsolete, submarginal (if present). Face quite oblique, straight, quadricarinate, the middle pair subparallel. Pronotum slightly constricted in the middle, tricarinate, the lateral carinæ slightly and regularly curving inward at the middle, a little wider apart at posterior extremity than at the anterior; posterior sulcus subdistinct, situated a little behind the middle; anterior margin subtruncate; posterior margin obtusely rounded. Elytra narrow, extending slightly beyond the abdomen, semi-transparent; the lower (anterior) field without veinlets on the basal half; the apical half with regularly transverse veinlets; the middle portion of the upper (posterior) part of the disk with similar transverse veinlets. Wings narrow, as long as the elytra. Abdomen slender; subanal plate with a slight tubercle on its upper margin; apex acuminate; cerci slender, cylindrical. Posterior femora slender, elongate, extending beyond the abdomen. Posterior tibiæ with numerous minute spines,—seventeen or eighteen in the outer row. Prosternum unarmed.

Color (alcoholic).—Ferruginous or rufous, varied with fuscous and yellowish stripes. Face rufous; cheeks and occiput ferruginous-brown, with two narrow, dim, paler, longitudinal lines each side. Pronotum ferruginous, with a broad fuscous stripe on each side; the lower margin striped with yellowish. Upper (posterior) margin of the elytra yellowish, forming a dorsal stripe when closed; a narrow, submarginal, yellow stripe along the costal (lower) submarginal space, extending from the base about half the length of the elytra; remainder dark fuscous, forming a broad middle stripe

on each elytron, extending from the base to the apex, widening toward the apex. Wings black, or very dark fuscous; this color being almost uniform throughout. Posterior femora ferruginous, except the disk, which is occupied by a dark-fuscous or black stripe. Venter yellowish; sternum rufous.

♂.—Length to tip of abdomen, 1.10 inches; elytra, 0.75 inch; posterior femora, 0.62 inch; posterior tibiæ, 0.62 inch.

Lower Arizona; from the collection of 1874; H. W. Henshaw, collector.

The present species is evidently closely allied to *S. leucocerca*, as is indicated by the color of the wings, and form of the subgenital plate of the male; but *leucocerca* has the posterior lobe of the pronotum roughly punctate, which clearly distinguishes it from our species. The want of this last character would possibly exclude it from Stål's genus as now restricted, yet the other characters are so clearly and distinctly marked that I have no hesitancy in placing it here, although this may necessitate the dropping of this character from the generic distinctions.

CHRYSOCHRAON.

CHRYSOCHRAON VIRIDIS, Scud.

Chrysochraon viridis, SCUD., Bost. Jour. Nat. Hist., 1862, vii, 455.

Stål has described this under the name *Truxalis angusticornis* (*Recensio*, 105) as a new species. His specimen was from Carolina.

GOMPHOCERUS.

GOMPHOCERUS CARPENTERII, Thos.

PLATE XLIV, FIG. 5.

Gomphocerus Carpenterii, THOS., Bul. No. 2 U. S. Geol. Surv. Terr., 1874, 65.

I find a few specimens of this singular species in the last collection. Although there is nothing accompanying the collection to indicate the exact locality where, or altitude at which, it was found, yet, as it is a true montane species, I presume it was obtained in the mountains of Northern New Mexico or more probably of Southern Colorado. I have also received a large number of specimens from Mr. Putnam, of Iowa, chiefly males. In this collection I find not only the male, but also some specimens which I feel quite well satisfied are the females of this species; but as they vary somewhat I will give a short description of one of the best specimens

before me so far as it differs from the description of the male heretofore published.

The margins of the vertex meeting in a somewhat obtuse angle; the club of the antennæ distinct, but not so broad as in the male. The pronotum scarcely gibbous, as in the male; slightly constricted in advance of the middle; the lateral carinæ forming a distinct angular convergence in advance of the middle, and diverging anteriorly and posteriorly; median carina (also in the male) distinct; posterior margin obtusely rounded, almost truncate. Elytra and wings abbreviated, the former extending over but three or four abdominal segments, lanceolate, with longitudinal nerves (also in the male) prominent. Posterior femora a little shorter than the abdomen.

Color (after long immersion in alcohol).—As the male, except as follows:—face brown; pronotum dark-yellowish on the sides, with elongate dashes and scattered spots and dots of dark fuscous; the upper portion of the sides in the exterior angle of the lateral carinæ black; dorsum yellowish, with a triangular black spot on the posterior lobe each side of the median carina; elytra brown; posterior femora reddish-brown, with two or three very oblique, somewhat irregular, dusky stripes across the external face.

Length about 1 inch; elytra, 0.12 to 0.15 inch.

STENOBOTHRUS.

STENOBOTHRUS OCCIPITALIS, Thos.

Stenobothrus occipitalis, Thos., Synop., 1873, 81.

Dr. Brunner de Wattenwyl, to whom a specimen of this species was forwarded, gives it as his opinion that it will have to be transferred to *Oxycoryphus*. As it does not belong here, and closely approaches the latter genus, he is probably correct in this opinion.

STENOBOTHRUS CURTIPENNIS, Scud.

Stenobothrus curtipennis, Scud., Bost. Jour. Nat. Hist., 1862, vii, 456.
Stenobothrus longipennis, Scud., Bost. Jour. Nat. Hist., 1862, vii, 457.
Locusta curtipennis, Harr., Cat. Ins. Mass., 56.
Chloëaltis curtipennis, Harr., Rep., 3d ed., 184, pl. 3, f. 1.

Several specimens of the long-winged variety are contained in the collections of 1872 and 1873.

STENOBOTHRUS COLORADUS, Thos.

Stenobothrus coloradus, Thos., Syn. Acrid., 82.
Stenobothrus bicolor, Thos., U. S. Geol. Surv. Terr., 1871, 465.

A single specimen of this species is contained in the collection, and is the first I have seen from the west side of the mountains, showing its range to be much greater than I had supposed.

OEDIPODINI.

This group, as heretofore stated, I am disposed to limit by removing from it the following genera, and transferring them to *Tryxalini*, viz :—*Oxycoryphus*, *Acrolophitus*, *Pedioscertetis*, *Chrysocraon*, *Stenobothrus*, and *Gomphocerus*.

As might have been expected, it is better represented than any other group, as the barren plains and dry mountain regions of the West appear to be peculiarly adapted to these orthopteral forms.

TRAGOCEPHALA.

Modifying the group to which this belongs, as above stated, and retaining the arrangement of the groups as given in my Synopsis, this genus will, so far as North American genera are concerned, form the connecting link with *Tryxalini*.

Œ. sordida, Burm., and *Œ. costalis*, Scud., have been transferred by Stål to this genus, a change which I think is justifiable and in which I concur.

TOMONOTUS, Sauss, (ARPHIA, Stål).

As before stated, Stål has wholly ignored *Tomonotus*, and established *Arphia* for the reception of *T. sulphureus* (*Œ. sulphurea*) and congeneric species. Both the species which Stål admits into his new genus are represented in the collection.

TOMONOTUS SULPHUREUS, Fabr.

Gryllus sulphureus, Fabr., Syst. Ent., ii, 59.
(*Locusta*) *sulphureus*, Gmel., Linn. Syst. Nat., i, 2079.
Acridium sulphureum, Oliv., Encyc. Méthod., vi, 227.
Locusta sulphurea, Harr., Rep., 177, pl. 1, f. 6.
Œdipoda sulphurea, Burm., Handb. Ent., ii, 643.
Tomonotus sulphureus, Sauss., Rev. et Mag. Zoöl., xiii, 1861, 321.
Arphia sulphurea, Stål, Recensio, 119.

The two or three specimens of this species found in the collection are

very dark, and indicate an approach to *T. tenebrosus*, with which it is evidently closely allied. As will be seen, I have in this case, for the reasons heretofore given, retained Saussure's generic name, rejecting Stål's as unnecessary. I am aware he considers Saussure's genus as improperly characterized, and as combining incongruous elements; but I have seen no evidence on this point, and I think the characters as given in my Synopsis are sufficiently limited and distinct to clearly define the group intended to be embraced, and, as I had the typical species before me while preparing the diagnosis, I am satisfied the rule that Stål has followed in other cases will certainly retain Saussure's generic name.

TOMONOTUS TENEBROSUS, Scud.

PLATE XLIII, FIG. 3.

Tomonotus pseudo-nietanus, THOS., Proc. Acad. Nat. Sci. Phila., 1870, 82.
Tomonotus tenebrosus, THOS., Synop., 107.
Œdipoda tenebrosa, SCUD., U. S. Geol. Surv. Neb., 251.
Arphia sanguinaria, STÅL, Recensio, 119.

The two varieties of this species are represented in the collection.

I give Stål's description of his *A. sanguinaria* for the benefit of American entomologists, and to show that I am correct in considering it as a synonym.

"Ferruginous-fuscous; posterior margin of the pronotum black-spotted; elytra opaque, paler near the apex; wings sanguineous, with the broad posterior external margin and a short anterior ray dark-fuscous.

♂, length, 20 millimeters. Vancouver's Island.

Very similar to *A. sulphurea* (Stål), but distinguished by the structure of the head, the lower crest of the pronotum, and the sanguineous wings. A very distinct (median?) carina running along the vertex, interrupted at the base of the vertex; apex of the vertex truncate, forming an obtuse angle with the frontal costa (as seen from the side); margins elevated, and converging posteriorly (?) then subparallel, becoming obsolete near the base of the head; frontal costa punctate, slightly narrowed at the base (Stål's specimen at this point was imperfect). Tempora smaller than in the preceding species. Crest of the pronotum equal throughout, not arcuate, incised (not notched) between the lobes. Posterior femora black internally,

pale bifasciate behind the middle. Posterior tibiæ fuscous, with a pale annulation near the base."

This is evidently the ash-brown variety common in Nebraska and Dakota, which has the fuscous dashes on the posterior lobe of the pronotum and the elytra sprinkled with fuscous dots. It is intermediate between the dark or black variety and that with the pale-colored pronotum.

Dr. Brunner de Wattenwyl remarks, in a letter to me, that he considers *T. tenebrosus* as but a variety of *sulphurea*, and that these and *T. xanthopterus* belong to the genus *Pachytylus*.

These are the first specimens I have seen from the west side of the Wahsatch range. Its range is now known to extend from the western border of Minnesota to the southeast border of Nevada, and from Northern Wyoming to New Mexico; and I am of the opinion it will be found as far south as Mexico. The sharp crackling note of the male and bright-red wings of this species, which are so plain during flight, easily distinguish this species from any other in the West with which I am acquainted.

CAMNULA, Stål.

This is a new genus established by Stål for the reception of the following species from Vancouver's Island.

CAMNULA TRICARINATA, Stål.

Camnula tricarinata, STÅL, Recensio, 120.

I give the following from the "*Recensio*", as the species is North American.

"Pale reddish-yellow; the front on each side of the base to the tempora or between the tempora and antennæ and a stripe on the cheeks behind the eyes black. Elytra next the base reddish-brown; costal area paler, spotted with fuscous; apical portion subhyaline, fuscous-veined; and obsoletely nebulous. Wings hyaline; veins dusky. Posterior femora obliquely fusco-bifasciate; apex fuscous; posterior tibiæ pale; spines, except at the base, black.

"♂ ♀.—Length, 19–25 millimeters.

"Similar to *Tragocephala sordida*."

OEDIPODA, Latr.

I would be glad if I could seize upon this opportunity to arrange our North American species under the genera which Stål has very properly carved out of this heterogeneous group, but am unable to do so, as my specimens are placed in the Agricultural Department at Washington. I can therefore only refer to such species as are contained in the collection now under consideration and those mentioned by Stål in his work.

OEDIPODA CAROLINA, Linn.

Acrydium carolinum, De Geer, Mem., 1773, 3, 491.
Gryllus carolinus, Thunb., Mem. Acad. St. Pet., 1815, 5, 239.
Œdipoda carolina, Serv., Hist. Orthop., 1839, 722.

This species, of which several specimens are in the collection, appears to be Stål's type of the genus. This widespread species is found on the plains of Nevada and Arizona without any marked variation from the eastern specimens. I may remark here, that during the past summer (1873) I saw it more abundant on one spot in the northwest part of Washington City than at any other spot in the limits of my observations.

OEDIPODA HOFFMANII, *sp. nov.*

Œdipoda hoffmanii, (copied into Synopsis, 127).

Very closely allied to *Œ. trifasciata*, and possibly it may be but a variety of that species, yet there are some variations which appear to mark it as distinct. The only specimen which has been preserved dry is so badly damaged, that it is impossible to do more than indicate its characters; even the sex is unknown, as the apex of the abdomen has been broken off, and the antennæ and legs are wanting.

The occiput ascending and the top of the head somewhat elevated, more so than in *Œ. trifasciata;* eyes ovate, large, prominent; vertex slightly elongate and expanding slightly in front of the eyes; margins raised; a slight median carina apparent; frontal costa sulcate, very slightly contracted below the ocellus; lateral carinæ arcuate, but not angled, extending to the corners of the face. Pronotum as in *Œ. trifasciata*, except that at each posterior lateral angle there is a minute tooth pointing downward. Elytra of usual length; when closed, they present an unusually flat surface on the

dorsum, forming right angles with the deflected portion. The metasternum appears to be shorter than is usual in the other species, but I have no male specimens at hand at this time to determine this positively.

Color (siccus).—The color and markings very similar to *Œ. trifasciata*, except that the middle and outer bands are less distinct, and the middle and apical spaces have a few brown dots in them; the bands are also of a deeper reddish-brown than the other species.

I at first laid this aside as a specimen of *Œ. trifasciata*, but in looking at it again the peculiarly flat dorsal surface of the closed elytra attracted my attention; the tooth at the lateral angle and somewhat elevated occiput appear sufficient to distinguish it as a new species. I have therefore described it as new, naming it in honor of Dr. W. I. Hoffman, who collected it while accompanying the expedition in Arizona.

OEDIPODA TRIFASCIATA, Say.

Gryllus trifasciatus, Say, Ent. ed. Lec., i, 78, pl. 34.
Œdipoda pruinosa, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 80.

A few specimens of this widely spread western species were obtained at different localities in Southeastern Nevada, Arizona, and New Mexico. Dr. Brunner de Wattenwyl places this in *Sphingonotus*, to which *Œ. Hoffmanii* will also have to be referred if he is correct.

OEDIPODA UNDULATA, Thos.

Œdipoda undulata, Thos., U. S. Geol. Surv. Terr., 1871, 460.

This species is readily distinguished from closely allied forms by its broad papilioniform wings, which are very distinctly and regularly undulated along the posterior margin. Its general color is an ash-brown; the elytra being marked with minute dusky spots or dots. The wings in the alcoholic specimens are pale yellow at the base; the apical third being more or less dusky. The length of the body is a little more than one inch in the female; the elytra extend beyond the abdomen about one-third their length.

Dr. Brunner de Wattenwyl, of Vienna, to whom I sent a specimen of this species, says it is a true *Œdipoda* as the genus is now restricted, but he thinks it is identical with *Œ. ochraceipennis*, Blanch., a South American

species. I have been unable to decide positively in regard to this, as the only copy of Gay's Fis. Hist. Chili to which I have had access wants the plate on which this species is figured. By a letter recently received from Dr. E. C. Reed, of the Museo Nacional, Santiago, I learn a package of Chilian *Acrididæ* has been forwarded to me. From this I may be able to determine this point. I have received the package since the above was written and in it find a specimen of the latter species, but it is so badly damaged that I am unable to decide with certainty as to the identity of the two, yet it is evident they are closely allied.

Although I collected this species along the eastern base of the Rocky Mountains, I did not have my attention called specially to it at the time my collection was made; nor was I aware it existed beyond the mountains until I found it in the collection of 1871.

OEDIPODA CINCTA, Thos.

Œdipoda cincta, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 80.

There is but one rather small specimen of this species in the collection.

OEDIPODA BELFRAGII, Stål.

Œdipoda belfragii, Stål., Recensio, 129.

This is a new species described by Stål as coming from Illinois. In order to call the attention of our western entomologists to it, I give the author's description in full.

"Fuscous-brown; the head variegated with cinereous; carina of the head and of the posterior femora, also the posterior margin of the pronotum, sprinkled with black; antennæ annulated with fuscous. Pronotum with the posterior margin acute-angled; crest somewhat prominent, profoundly incised between the lobes. Elytra pale grayish-brown, somewhat translucent toward the apex, where they are also clouded with fuscous. Wings pale-yellow at base, with a broad black band across the disk, arcuate, and narrowed internally; apex transparent, with fuscous veins. Anterior legs subannulated with fuscous; posterior femora with the fascia and apex black, the inferior margin and exterior side hairy; posterior tibiæ pale yellowish, fuscous at the base, spines tipped with black, hairy.

♀, length 25 millimeters. Illinois.

In the structure of the head and pronotum similar to *Œ. carolina*, but differs in being smaller, the elytra and wings less ample, and the former less less densely reticulated; the pronotum behind the middle being subalutaceous; and in the color of the wings. The posterior angle of the lateral lobe of the pronotum rounded."

Although this description differs considerably from the description of my *Œ. cincta*, which is found in Illinois, I am rather inclined to believe they are identical; otherwise I am wholly unacquainted with it.

OEDIPODA PHŒNICOPTERA, Germ.

Œdipoda phœnicoptera, BURM., Handb. Ent., ii, 643.
Locusta apiculata, SAY, MSS. (Harr. Cat. Ins. Mass., 56).
Locusta corallina, HARR., Rep., 176.
Œdipoda obliterata(?), GERM., BURM., Handb. Ent., ii, 643.
Œdipoda corallina, ERICHS., Archiv. f. Nat., ix, 2, 229.
Acridium phœnicopterum, DE HAAN, Bijdr. Kenn. Orthop., 144.

Stål places *Œ. discoidea* in Saussure's genus *Hippiscus*, and, as this is a very closely allied species, it should probably be placed in the same genus, though, in some respects, it appears to correspond more closely in generic characters, with his *Pycnodictya*.

Hippiscus phœnicopterus, Burm., will therefore be its new name, thereby remanding another name to the list of synonyms.

There are four specimens in the collection of 1872.

OEDIPODA CORALLIPES, Hald.

This, in all probability, will have to follow *Œ. discoidea* to *Hippiscus*. I find but one specimen of this species in the collection, which was taken in Nevada. It would appear from this fact that it does not extend very far southward in the intermontane area.

OEDIPODA WHEELERII, *sp. nov.*

PLATE XLIV, FIG. 1.

Has much the appearance of *Œ. trifasciata*, but is quite distinct, and possibly is not congeneric as Stål has limited the genera. The upper portion of the head rounded and smooth; seen from the front, elliptical; eyes small,

elliptical, and not prominent, widely separated. Vertex broad, arcuately deflexed, and passing into the frontal costa without any mark of distinction; the subhexagonal margin faintly outlined; a very slight median elongate tubercle; frontal costa broad, flat, rounded on the margins, and scarcely distinct from the face, not sulcate. Pronotum similar in form to that of *Œ. trifasciata*, expanding posteriorly, very slightly constricted or indented at the posterior sulcus, covered throughout, except a small space on the middle of the lateral lobes, with small tubercles, giving it a coarsely granulated appearance, forming thereby a strong contrast with the smooth head; posterior sulcus quite distinct, situated about the middle, and extending upon the sides; the other transverse incisions obsolete on the dorsum; median carina obliterated; lateral carinæ rounded and subobsolete; posterior margin rectangular. Elytra and wings extending but slightly beyond the abdomen; elytra rather narrow, minutely but densely reticulated, except about one-fifth at the apex, which is transparent, and has regular transverse veinlets; axillary vein connects with the anal vein. Posterior femora very broad; lower carina very prominent, but suddenly narrowed near the apex; shorter than the abdomen; anterior and middle femora small and slender.

Color (after immersion in alcohol).—Dull ash-brown, varied with fuscous; head, thorax, and legs almost uniform; a black puncture at each side of the lower extremity of the frontal costa; a small black spot at the lower corner of the face; a few black points on the dorsum of the pronotum. The elytra with four broad transverse fuscous bands, one about the middle of the basal half rather narrow and of regular width, the other three on the apical half, between which are alternate yellow bands; the anterior of these fuscous bands quite broad and widening upward (posteriorly); apex transparent; a narrow yellowish stripe along the humeral angle. Base and disk of the wings yellow; a broad, black, arcuate band along the exterior (posterior) margin, having a small transparent space at the apex. This band should perhaps be called submarginal, as the front portion curves slightly inward, and leaves an apical space, which is traversed by fuscous veins. Posterior femora with a few black dots on the external face, and an indistinct paler ring near the apex; internal face fuscous on the basal half, crossed by a fuscous band on the apical half, rest yellow. Tibiæ and tarsi pale; spines

tipped with black. The portions described as fuscous are in fact pale fuscous-brown. Antennæ slender.

♀.—Length, 1.9 inches; elytra, 1.5 inches; posterior femora, 0.85 inch.

This fine, large species forms an interesting link between *Œ. trifasciata* and *Œ. corallipes*, and with my *Œ. montana* well nigh fills up the hiatus. It agrees in every respect with Stål's genus *Pycnodictya*, except that in that genus the posterior lobe of the pronotum is much longer than the anterior, while in this species the two are nearly equal. He gives as the type of this genus the *Gryllus obscurus* of Linné, with *Œ. rosacea* of Serville as a synonym. Serville (Hist. Orthop., 728–729) describes the two as distinct species; and as his *Œ. rosacea* has "a slightly elevated carina" on the pronotum, it appears difficult to reconcile this with Stål's diagnosis. As he had access to Linnæus's type, this was most assuredly his guide in forming his genus; and Serville's description accords very closely with the generic characters so far as he gives them. The wings of these species are red at base, and possibly this was the original color in the species before me, but I think it was yellow.

Named in honor of Lieut. G. M. Wheeler, in charge of the expedition.

This species is placed in *Œdipoda* provisionally, as it must be removed when this genus is restricted to its proper limits. I am strongly inclined to name it at once *Pycnodictya Wheelerii;* otherwise a new genus will have to be formed for its reception.

OEDIPODA GRACILIS, Thos.

Œdipoda gracilis, Thos., U. S. Geol. Surv. Terr., 1871, 461.—*Id.*, Synop., 121.

I find in the collection a specimen which probably belongs to this species; but the head and thorax are so badly damaged that it is impossible to determine this with any degree of certainty.

OEDIPODA NEGLECTA, Thos.

Plate XLIV, Fig. 3.

Œdipoda neglecta, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 81.

I find one specimen of this species in the collection of 1873, probably from Southern Colorado. I found it quite common in Northern Utah and

Southeastern Idaho; but I have unintentionally omitted to mention this locality in my Synopsis. I have also traced it east to Southern Illinois; and from this collection I find that it extends into the borders of Nevada and Arizona.

This is one of the most unvarying species in reference to its characteristics I have ever had the pleasure of naming. The unvarying markings and carvings of the vertex confirm the propriety of selecting these as specific characters.

It approaches very near to Stål's *Trilophidia*, and probably belongs to that genus; otherwise it also will require the formation of a new genus, as it evidently does not belong to *Œdipoda* as restricted. Dr. Brunner de Wattenwyl thinks this and also *Œ. montana* and *Œ. corallipes* should be placed in *Leprus*.

OEDIPODA HAYDENII, Thos.

Œdipoda haydenii, Thos., U. S. Geol. Surv. Terr., 1871, 460.—*Id.*, Synop., 120.

I find no specimens in the collection, but mention it here to state that it will have to be transferred to Stål's new genus *Cosmorhyssa*, which is distinguished by the numerous elongate tubercles or short carinæ on the posterior lobe of the pronotum, and by the character of the vertex and frontal costa, as given in my Synopsis (p. 120). This species should, therefore, hereafter be known as *Cosmorhyssa haydenii*, Thos.

OEDIPODA FENESTRALIS, Serv.

This has been transferred to *Psinidia*, Stål, in which he also places two new species—*P. capito* and *P. fuscifrons*—from Texas. It is probable that my *Œ. kiowa* will also fall in this genus.

OEDIPODA MARATIMA, Harr.

This is now, according to Stål, *Trimerotropus maratima*. It is not found in the collection, but is mentioned here to show in what genus it belongs. Where no remark is made to the contrary in speaking of other species which Stål's arrangement affects I accept the change, and shall hereafter adopt the new generic name.

OEDIPODA UTAHENSIS, *sp. nov.*

PLATE XLIV, FIG. 2.

Female.—Very similar to *Œ. carolina* in general color and appearance, but differs in size and in the color of the wings. Vertex slightly deflexed, subhexagonal or subelliptical, with two slight depressions at the tip; frontal costa sulcate below the ocellus. The crest of the pronotum a little more elevated than in *Œ. carolina;* the notch distinct. Elytra and wings much longer than the abdomen. Posterior femora passing the abdomen; upper carina and rather broader than in *Œ. carolina.*

Color (alcoholic).—Dull-brown, dotted with fuscous; the brownish is uniform except on the elytra and posterior femora, the former being sprinkled on the upper portion of the basal half and on the apical portion with very small fuscous spots or dots; the latter marked with a few fuscous dots along the upper half. Wings pale-yellow at the base and crossed by a very broad, black, arcuate band just beyond the middle; apex pellucid, with dark veins. The black band of the wing, which is quite broad, occupying nearly one-third of the wing, is one of its distinguishing characters; the marginal ray is much abbreviated and broad. Apex of the elytra transparent.

Dimensions.—Length of body, 1.15 inches; to tip of elytra, 2 inches; elytra, 1.2 inches; posterior femora, 0.75 inch.

I have heretofore seen a specimen of this species, which was given to me by the curator of the Salt Lake City Museum, but, being doubtful as to its being a distinct species, marked it provisionally with the name here given, but did not publish a description, waiting an opportunity to examine other specimens.

OEDIPODA SPARSA, *sp. nov.*

Male.—Of moderate size, and with closed wings, strongly resembling, in color, the paler specimens of *Tomonotus tenebrosus.*

Eyes large and more than usually prominent. Occiput very short. Vertex elongate, slightly deflexed; the central foveola rather distinct, with sharply and prominently raised margins, and at the anterior margin, on the fastigium, is an angular depression or pit, which sends back an acute angular projection into the front margin of this foveola; the tempora scarcely

foveolate, being simply flat triangular spaces. Frontal costa rather narrow; sides parallel, distinctly channeled, scarcely or not expanding at the ocellus; ocelli immediately below the external angle of the tempora and close against the front margin of the eyes at the middle.

Pronotum rather narrow; median carina distinct, though but slightly raised on the posterior lobe, more prominent on the anterior lobes, severed twice by the transverse incisions. The posterior sulcus about or slightly in front of the middle; the middle lobe shorter than the anterior one; lateral carinæ subdistinct; anterior margin distinctly obtuse-angled, posterior margin about a right angle or very slightly acute. Elytra and wings passing the abdomen fully one-third their length. The wings are broad and somewhat papilioniform, reminding us very much of *Œ. undulata*, to which, in fact, this species appears in several respects to be closely allied.

Color (alcoholic).—Dull ashen-brown throughout, sprinkled with fuscous dots. The elytra are somewhat darker brown on the basal third, which is the extent of the densely veined portion; the other two-thirds being less densely veined, semi-transparent, and sparsely sprinkled with fuscous dots. Wings transparent; the veins and veinlets of the apical half dark; the veins prominent and strong; it is possible these were of a bluish tint when living, yet they may have been tinged with greenish-yellow.

Length of body, 0.85 inch; elytra, 1.00 inch; posterior femora, 0.50 inch. New Mexico.

The female has a very distinct longitudinal carina through the central foveola of the vertex. The interior of the posterior femora marked with black or dark-brown, and slightly sprinkled externally.

Length to tip of elytra, 1.25 inches.

It is possible this belongs to *Œ. undulata*, but if so the venation of the wings is very different, the *undulata* having the transverse veinlets very regularly scalariform and close, while in this there is no such marked arrangement. This single character I think is entirely sufficient to show the two are quite distinct. The two species are true *Œdipodæ* as the genus is now restricted.

PSINIDIA, Stål.

As I find in the collection two specimens of my *Œ. kiowa*, which I am

satisfied belong to this genus, I give briefly its characters from the "*Recensio.*"

Median carina of the pronotum somewhat prominent and twice notched; posterior margin distinctly angulate, generally rectangular; posterior lobe much longer than the anterior. Eyes never longer than the infraocular part of the cheeks, but generally much shorter. Axillary vein confluent with the anal vein.

I think, from the species mentioned, that the top of the head is generally elevated, and the median foveola of the vertex probably confluent with the sulcus of the frontal costa.

PSINIDIA FENESTRALIS, Serv.

Œdipoda fenestralis, SERV., Hist. Orthop., 726.

PSINIDIA KIOWA, Thos.

Œdipoda kiowa, THOS., U. S. Geol. Surv. Terr., 1871, 461.

Two specimens in the collection of 1872; locality not given.

By some oversight I described this species the second time in my Synopsis, 123, as new, under the name *Œ. plattei*, which must therefore be suppressed.

EPHIPPIGERA, Hald.

EPHIPPIGERA TSCHIVAVENSIS, Hald.

A single specimen of this singular species was contained in the collection, but I find on examination that it is now missing, so that I cannot state positively where it belongs, but an examination made when I first discovered it satisfies me that it should be placed near *Eremobia.* The figure given in Stansbury's report is correct. The specimen I examined was a perfect female, which has satisfied me that I was mistaken in supposing Haldeman's specimen was a pupa. If I should find it, I will determine its position, and report on it hereafter.

TROPIDOLOPHUS, Thos.

TROPIDOLOPHUS FORMOSUS, Say.

Gryllus formosus, SAY, Am. Ent. ed. Lec., i, 78, pl. 34.
Tropidolophus formosus, THOS., Synop., 138.
Cyrtolopha formosa, STÅL., Recensio, 118 (note).

The collection of 1873 contains one very large specimen (♀) of this

species, being a little more than two inches in length; wings abbreviated, as I believe is usual in the females, yet I see I have not mentioned this fact in my description, although I recollect very distinctly that I had short-winged females in my collection at that time.

I do not find that Stål has anywhere given the characters of his genus except what is given in a note to page 118 of his "*Recensio*," where he states that "*Cyrtolopha* (typ. *Gryllus formosus*) appears to stand midway between the *Œdipodæ* and *Ommexacha;* eyes small; dorsum of the pronotum throughout its whole length elevated into a high serrulate and arcuate crest, posteriorly strongly produced, angulate anteriorly; legs long and slender; also slender in form (*statura*)."

Here the question of date in reference to the publication of my Synopsis and Stål's "*Recensio*" arises in determining which generic name shall stand. As a matter of course, I will retain that which I have given until it is shown that Stål's has precedence.

BRACHYPEPLUS, Charp.

BRACHYPEPLUS MAGNUS, Girard.

A number of specimens of this singular but well known species are found in the collections of both years.

B. verescens, Charp., I think, is but a variety of this species. In the collection made in Southeastern Nevada and Northern Arizona, some were obtained in color, which, although not agreeing exactly with Charpentier's figure and description, appear to form an intermediate link between the two both in size and color; in fact, rendering it doubtful to which they belong.

EREMOBIA.

EREMOBIA MAGNA, *sp. nov.*

PLATE XLV, FIG. 1.

Female.—Vertex deflexed, broad, quadrate, slightly enlarged in front of the eyes; margin slightly elevated; central portion nearly flat, with a distinct median carina; tempora vertical, subobliterated, in which the lateral ocelli are situated. Frontal costa expanded and prominent between the eyes, slightly sulcate, with two indistinct diverging lines of minute tubercles

above the ocellus, constricted and subobliterated below the ocellus. The face and cheeks rugose. Pronotum broad and rapidly expanding posteriorly to the middle legs, flat and rugose above; sides perpendicularly deflexed, forming distinct humeral angles; transverse incisions distinct, the posterior in front of the middle; median carina somewhat distinct on the posterior lobe, obliterated on the anterior lobes; lateral carinæ distinct, not elevated; disk of the posterior lobe elongate-tuberculate; anterior margin truncate; the posterior extremity elongate, extending upon the second abdominal segment, giving the posterior lobe an elongate-ovate form; posterior lateral margins quite oblique, and slightly but regularly incurved. Abdomen very large, tapering rapidly posteriorly, not carinate above. Elytra squamose, extending only to the middle of the second abdominal segment; minutely reticulated; longitudinal veins inconspicuous; wings minute. Posterior femora shorter than the abdomen, robust, and convex on the disk; pinnæ not distinctly angulated on the disk but simply curved, and somewhat bifurcated above, giving the disk somewhat the appearance of being covered by imbricated scales; upper and lower carinæ hairy. Posterior tibiæ curved forward in the lower half, expanding below, with strong, somewhat distant, and slightly incurved spines nearly to the knee, hairy, especially between the rows of spines. Anterior and middle legs pilose. Meso- and meta-sternum very broad and flat; the posterior margin of the latter squarely truncate with no entering lobe or sinus. Prosternum about half the width of the meta-sternum; a somewhat prominent curved ridge extending across from one leg to the other. Antennæ of medium length, filiform.

Color (alcoholic).—Dull ochreous or yellowish-brown; a few black points on the anterior portion of the pronotum; elytra brown with paler reticulations; interior face of the posterior femora dark-brown or black; tips of the valves of the ovipositor and of the tibial spines black; sternum and venter yellow.

Dimensions.— ♀, length, 1.90 inches; pronotum, 0.75 inch; width of pronotum at the broadest point, 0.50 inch; elytra, 0.25 inch; posterior femora, 0.70 inch; posterior tibiæ, 0.65 inch; width of mesosternum, 0.56 inch. ♂ much smaller.

Lower Arizona. From the collection of 1874; H. W. Henshaw.

Stål has restored the generic name *Eremobia* of Serville in place of *Thrincus* of Fischer, and I think properly; I have therefore followed him. The specific name *magna* is given because it is supposed to be the largest species of the genus known.

ACRIDINI.

This group corresponds almost exactly with Stål's subfamily *Acridiidæ*. He places *Rhomalea* in it, and I think very correctly. The changes in the genera and transfer of species will be noticed in the appropriate places. I shall retain the arrangement of the genera as given in my Synopsis.

PEZOTETTIX, Burm.

As heretofore stated and for the reasons given, I shall not follow Stål in transferring our *Calopteni* to this genus, yet, at the same time, I admit that these groups need revision, and would gladly adopt any consistent arrangement which does not wholly revolutionize these genera. I may remark here that Dr. Brunner de Wattenwyl thinks my *P. picta* is the *Dactylotum bicolor* of Charpentier; but a single glance at a specimen in color would convince him of his error.

PEZOTETTIX UNICOLOR, Thos.

PLATE XLV, FIG. 5.

Pezotettix unicolor, THOS., Synop., 151.

I find some specimens which, although differing somewhat from the type, I think belong to this species. The frontal costa is not sulcate, and the wings are shorter. They are contained in the last collection, and were probably obtained in the mountains of Southern Colorado, although the exact locality is not given.

PEZOTETTIX OREGONENSIS, *sp. nov.*

PLATE XLV, FIGS. 2, 3.

Caloptenoid in the form of the head and thorax; wings abbreviated.

Male.—Small and slender. Vertex but moderately deflexed, and

slightly sulcate; frontal costa flat, punctured, scarcely sulcate. Pronotum compressed on the sides, which are parallel; lateral carinæ somewhat distinct though not sharp; tranverse impressions distinct; the two anterior distant from the posterior, which is situated behind the middle; posterior margin obtusely rounded; the posterior lateral margins ascending without any inward curve or angle. The thorax appears rather longer than usual, especially the prothorax; the middle coxæ falling behind the lower corner of the pronotum a little farther than usual. Elytra very short, extending only upon the second segment, ovate, not quite meeting on the back. The spines or processes of the last abdominal segment long and slender, extending upon the super-anal plate more than half its length; a small tubercle at the base of each; cerci very broad, somewhat narrowed at the apex, but not suddenly decreasing in width; sub-anal plate terminating in a rounded tooth-like point. Anterior femora somewhat strongly arcuate.

Color (after immersion in alcohol).—A yellowish-brown, except as follows:—antennæ pale; eyes brown; a shining, dark-brown, quadrate spot on the side of the pronotum, extending from the anterior submarginal indentation to the posterior sulcus; a spot of similar color extending from the middle of the posterior lateral margin of the pronotum to the insertion of the middle legs; elytra brown, unspotted; a dark-brown stripe on the side of each abdominal segment except the last; spines of the posterior tibiæ black.

Length, 0.80 inch; elytra, 0.14 inch.

Although found in this collection, it is marked as having been obtained in Oregon by J. Haldeman.

PEZOTETTIX MARSHALLII, *sp. nov.*

PLATE XLV, FIG. 4.

Male and female.—Vertex narrow between the eyes, which are more than usually approximate, expanding somewhat in front, slightly deflexed, distinctly sulcate; frontal costa flat slightly depressed at the ocellus. The immediate foveolæ in which the antennæ are inserted have a more than usually prominent margin. Pronotum flattened and compressed on the sides, which are straight in both sexes, parallel in the male and slightly

diverging in the female, tricarinate, each about equally distinct, though not prominent, yet forming sharply defined angles; the two sides (halves) of the dorsum flat, but ascending slightly to the median carina; posterior margin obtusely and regularly rounded; posterior sulcus behind the middle, distant from the other two, all distinct but not profound. Posterior femora of the female not reaching the tip of the abdomen, about equal to it in the male. Elytra not extending beyond the middle of the second segment, obovate, not meeting on the back; wings but mere figments. Sub-anal plate of the male pointed (cerci and super-anal plate damaged); cerci of the female broad, short; super-anal plate thick, oblong, and subsulcate. Antennæ not extending beyond the tip of the pronotum.

Color (after immersion in alcohol).—

Male.—Brown, varied with yellowish. Eyes, top of the head, dorsum of the pronotum, elytra, and abdomen brown; an irregular spot on the upper portion of the side of the pronotum shining brown. Posterior femora with the disk reddish-brown; upper and lower margins yellow; two broad spots on the inner face dark, rest yellow, except the apex, which is also black. The female has the general color, greenish yellow, but I am inclined to think that usually this is darker, perhaps even brown; spot on the side of the pronotum and disk of the femora reddish-brown. The abdomen in both sexes keeled above.

Length, ♀, 0.75 inch; ♂, 0.62 inch. Mountains of Southern Colorado.

It is possible that the specimens I have marked as *P. unicolor* belong to this species.

Named in honor of Lieut. W. L. Marshall, U. S. A., who has made valuable collections of *Orthoptera.*

PEZOTETTIX HUMPHREYSII, *sp. nov.*

Belongs to *Pezotettix* proper of Burmeister as limited by Stål, and is closely related to *P. mendax*, Fisch.

Female.—Large and fleshy; abdomen short and tapering rapidly, scarcely reaching the tip of the posterior femora. Head large and convex above; eyes large and approximate above; vertex somewhat broad and expanding in front of the eyes, slightly channeled, usually a round pit or

large deep puncture in the channel exactly between the upper corners of the eyes; frontal costa very broad and flat, fading below; sides parallel; lateral carinæ quite distinct, diverging slightly toward the corners of the face. Antennæ of medium length. Pronotum short, cylindrical, without any lateral carinæ; median carina scarcely apparent; expanding slightly, but regularly, posteriorly; posterior sulcus about two-thirds back from the front, leaving the posterior lobe very short; the posterior margin truncate on the back, or curved slightly forward; the anterior lobes smooth on the sides, marked with distinct shallow depressions on the disk; the posterior lobe distinctly and densely punctured; the posterior lateral margin slightly curving inward as it ascends. Elytra mere figments on the sides, not meeting on the back, extending across two segments, spatulate. Wings appear to be entirely wanting. Cerci minute and tapering to a point; the super-anal plate rather large, triangular, broadly rounded at the apex, marked transversely so as to give it the appearance of being a part of two segments. The prosternal spine stout, conical, and somewhat transverse.

The *male* differs in being much smaller and less robust; the abdomen is but moderately enlarged at the apex; the cerci are much longer than in the female, flat, and enlarged at the base and apex, the apical portion being somewhat broader than the basal portion; the anterior apical angle is rounded, while the posterior one is somewhat acute, dentiform; the super-anal plate is bicarinate longitudinally; sub-anal plate slightly elongate and cone-shaped.

Color (after immersion in alcohol).—Yellow, with black and brownish markings; male and female similar. The general color throughout is a bright yellow, therefore I will note only the markings on this yellow ground. A broad piceous black stripe on the sides of the pronotum, extending from the anterior margin to the posterior sulcus, with an oblique yellow stripe extending through it from the lower anterior angle to the middle of the upper margin, thus leaving a triangular black spot above in front immediately behind the eye; the sides of the meso- and meta-thorax striped obliquely with black; a black spot on each segment under the upper margin of the elytra. All of these black markings are margined by a brighter yellow than that which surrounds it. Dorsum of the anterior lobes

of the pronotum brownish-yellow (probably olive when living); the posterior lobe rufous; a distinct bright-yellow spot, of uniform width, runs along the whole length of the dorsum of the abdomen, margined with black; disk sometimes fuscous. The color of the alcohol specimens probably varies but little from that of the living specimens.

Dimensions.—♀, length, 1.25 inches; posterior femora, 0.74 inch; posterior tibiæ, 0.63 inch. ♂, length, 1 inch; elytra, 0.18 inch; posterior femora, 0.62 inch; posterior tibiæ, 0.50 inch.

From Southern Arizona; collected by the expedition of 1874, and named in honor of Gen. A. A. Humphreys, the chief of the Engineer Corps, under which these expeditions have been conducted. It is a fine, robust species, well marked, and quite distinct.

OMMATOLAMPIS, Burm.

OMMATOLAMPIS VIRIDIS, Thos.

Ommatolampis viridis, Thos., Synop. Acrid., 156.
Caloptenus viridis, Thos., U. S. Geol. Surv. Terr., 1871, 450, pl. ii, f. 3.—*Id.*, Glover Orth., pl. xi, f. 3.

There is an imperfect specimen of this species in the collection; it is the first, so far as I am aware, that has been obtained west of the range.

CALOPTENUS, Burm.

CALOPTENUS SPRETUS, Uhler.

A number of specimens of this destructive species are contained in the last collection, a few only in the first, indicating that as we move southwest into Arizona it ceases to be so abundant as in Utah and farther east and north; whether this inference be correct or not I am not aware. So far as I can learn, it has not yet been found in California; but as it is found immediately east of the Sierra Nevada it is quite probable that it reaches to the Pacific, though it may not be migratory on the west side of the range. It is a matter of some scientific interest to learn positively in regard to this, and it would be well for collectors in California to look carefully for it. From a remark by Dr. Packard in the American Naturalist, I presume he has received specimens from California.

It is somewhat strange that the first specimen ever examined and named

should have been found in Southern Illinois, by the writer, and sent to Professor Uhler, of Baltimore, about the year 1860, though previous to that time various scientific expeditions had penetrated the western plains; yet it is but seldom seen in the section where that specimen was obtained.

The great distress it has caused in the Western States by the destruction of the crops the past season renders it a matter of public interest to ascertain whether there is any remedy for the evil. I think it extremely doubtful whether they can be brought under control by any practical scheme; yet the question cannot be fully decided until it is ascertained positively from what point the hordes visiting Kansas, Nebraska, and Minnesota come, and where they originate. While their history on the western side of the plains is pretty well known, but little appears to have been ascertained that is reliable in regard to their passage across the plains.

So far as I have been able to learn from personal observations and from information received in the west, they move north, south, and east, but seldom migrate westward. May it not be that settlements along the eastern flank of the Rocky Mountain range are pushing them eastward? It would be well for some one connected with the expeditions the Government is sending west to gather all the data in regard to their operations last season possible, and this should be done the coming summer, while the facts are fresh in the memory of the people of the sections visited by them. While it is quite probable no adequate remedy can be found, yet every means possible should be tried; and it is evident no progress can be made in this direction until their habits and history have been thoroughly studied. Much has already been ascertained, but an important gap yet remains to be closed; the swarms which visit these States must be traced back, step by step, to their starting place. Much can be done in this direction the next season, and while dates are fresh in the memory of the numerous sufferers this should be done.

CALOPTENUS OCCIDENTALIS?, Thos.

Caloptenus occidentalis?, Thos., U. S. Geol. Surv. Terr., 1871, 453, pl. ii, f. 2.

I find in the collection a specimen which appears to belong to this species, although it varies somewhat from the type. It differs in the following

respects:—the anterior and middle femora are not more slender than is usual in this genus; the prosternal spine is not unusually broad at the base, but is blunt and transverse, as described; the oblique brownish bands on the posterior femora wanting. But the specimen is a male, and shows the unusually broad cerci of this species; there does not appear to be any blunt tooth at the tip of the last abdominal segment, which has the same form as in *C. femur-rubrum*. It is, therefore, quite probable I was mistaken in this respect in my original description; but if I am correct in regard to the former, then this is a new species. This species appears to be closely allied to *C. femur-rubrum* on the one side and to *C. keelerii* on the other.

CALOPTENUS BIVITTATUS, Say.

Gryllus bivittatus, Say, Jour. Acad. Nat. Sci. Phila., iv, 308.
Locusta leucostoma, KIRBY, Faun. Bor.-Am. Ins., 250.
Acridium sanguinipes, HARR., Hitch. Rep., 583.
Acridium flavovittatum, HARR., Treat. ed. 1862, 173.
Acridium bivittatum, THOS., Trans. Ill. Agl. Soc., v, 449.
Acridium leucostomum?, DE HAAN, Bidjr. Kenn. Orthop., 143.
Acridium femoratum?, DE HAAN, Bidjr. Kenn. Orthop., 144.
Caloptenus femoratus, BURM., Hand. Ent., ii, 368.
Caloptenus bivittatus, UHLER, Say's Ent. ed. Lec., ii, 238.

The specimens of this species in the collection, captured at various points of the routes explored, appear to be unusually large, and, although preserved in alcohol, retain sufficient of the coloring to show that they belong to the greenish-yellow or olive variety.

CALOPTENUS YARROWII, *sp. nov.*

PLATE XLV, FIG. 6.

Female.—Very similar in appearance and form to *C. bivittatatus* Say, to which it is very closely allied.

Vertex scarcely sulcate; the frontal costa broad and slightly sulcate; antennæ scarcely reaching the tip of the pronotum; the joints distinct, each joint being somewhat enlarged at the tip. The transverse incisions of the pronotum distinct; the posterior one behind the middle; median carina distinct, though not elevated. Elytra and wings reaching the tip of the abdomen; the intercalate vein of the elytra present. Posterior femora not

reaching the tip of the abdomen. The inner angles of the mesosternal lobes rounded.

Color (after immersion in alcohol).—Brownish, varied with yellow. Face and cheeks yellow, tinged with brownish; two oblique brownish stripes on the cheeks extending from near the border of the pronotum downward and forward. The sides of the posterior and lower portions of the sides of the anterior lobes of the pronotum greenish-yellow; upper portions of the sides of the anterior lobes pale brown; a pale-yellow stripe extending from the vertex along each lateral carina to the anterior sulcus; the middle portion of the occiput and dorsum of the pronotum pale brown. The elytra brown, with four or five oblong yellow spots in a row along the disk; a pale-yellowish indistinct stripe running along the upper angle; nervules mostly yellow. Posterior femora yellow with three oblique reddish stripes across the external face, which cross the upper margin and extend upon the upper portion of the inner face; lower margin of the outer and inner face yellow. Tibiæ dull yellow (probably bluish when living); spines black. Tips of the valves of the ovipositor black.

Length, 1.3 inches; elytra, 0.87 inches; posterior femora, 0.62 inch.

Named in honor of Dr. H. C. Yarrow, the surgeon and zoölogist of the expedition.

One specimen only found in the collection, but this is in good order.

ACRIDIUM, Geoff.

ACRIDIUM SHOSHONE, *sp. nov.*

PLATE XLIII, FIG. 2.

Acridium shoshone (extract from this MSS. published in the Proc. Acad. Nat. Sci. Phila., 1873, 296).

By some oversight I neglected to state in my Synopsis that such was the case, which should have been done, as the description was published by permission of the officer in charge in order that I might copy it into my Synopsis, it being understood that it and the other species published at the same time should appear in this paper as new, a note to be made of the fact.

Large size; green; without any dorsal stripe.

Female.—Vertex nearly horizontal,; sides angularly expanding in front of the eyes; flat frontal costa prominent, sides parallel, sulcate from the ocellus downward, above the ocellus somewhat gibbous and punctured; lateral carinæ very prominent, parallel. Pronotum slightly expanding posteriorly, coarsely and reticulately punctured; median carina distinct, severed by the three transverse impressions. Elytra and wings passing the abdomen. Cerci very short, broad at the base, narrowed and rounded at the apex. Posterior femora much enlarged at the base; posterior tibiæ considerably enlarged at the apex. Prosternal spine robust, cylindrical, and nearly straight. Pectus punctured. Abdomen of the male somewhat elongated; cerci very broad and flat, very slightly and obtusely notched at the apex, which is bent upward and over the last segment; subanal plate elongate, turned upward, with a distinct square notch at the apex.

Color.—Dark olive-green. Ocelli bright transparent-umber; eyes brown; cheeks yellowish, with a dark-green stripe extending downward from the eyes. The pronotum has some pale spots on the sides, and sometimes the posterior lobe is tinged with brown. Elytra uniform green, somewhat transparent at the apex, and in some specimens faintly tinged with brown. Wings hyaline; nerves and nervules dark-brown. Posterior femora greenish above and below; pinnæ of the disk alternately white and green, the white occupying the flat interspaces; inner face greenish-yellow. Posterior tibiæ bright-vermilion, the under surface being striped with yellow; spines yellow at the base, tipped with black. Venter and pectus dark-green, sometimes varied with dark-brown.

Dimensions.—♀. Length, 2 to 2.25 inches; elytra, 1.7 to 2 inches; posterior femora, 1.25 inches; posterior tibiæ, 1.2 inches. ♂. Length, 1.6 to 1.75 inches.

Several specimens of this fine, large species are in the collection, having been obtained in Southeastern Nevada and Arizona. In some respects, it is closely allied to *A. obscurum*, Burm., but is evidently quite distinct, as it wants the stripe on the pronotum and black dots on the hind femora. It is one of the largest species known to the orthopteral fauna of the United States. This, with the other new and subtropical species found in the collection, shows clearly that the southern portion of the area visited by the

expedition embraces the northern boundary of the subtropical faunal district. The beautiful Rhomalean species hereafter mentioned is strongly confirmatory of this opinion.

ACRIDIUM ALBOLINEATUM, *sp. nov.*

PLATE XLIII, FIG. 1.

Very similar in form, size, and general color to *A. emarginatum*, Uhler, and may be described by the colors, which are very marked and distinct.

Female.—Face marked with perpendicular alternate stripes of black and white (or pale yellow, probably yellow when living, as the specimen before me has been immersed in alcohol); the frontal costa black, with a narrow yellow line on each margin and one in the middle, the latter not distinct except above the ocellus; a dark stripe extending downward from each antenna, and each bordered each side by broad, parallel, yellowish stripes. The yellow line above the ocellus is continued upon the vertex, occiput, and along the middle of the pronotum and the inner margins of the elytra, forming a dorsal stripe, widening posteriorly. Lower half of the sides of the anterior lobes of the pronotum yellow; a yellow stripe from the base of the elytra to the insertion of the middle legs; and another extending upward from the insertion of the posterior legs. The remaining portions of the pronotum and elytra uniform light brown. Wings transparent yellow. Anterior and middle legs yellow on the anterior (outer) face and brown on the posterior (inner) face. Posterior femora with the lower half of the disk white; upper half with a black stripe from the base to the middle, the outer end extending in the form of a short band over the upper carina; there is another broad black band midway between this and the apex, rest yellow; apex black with a yellow spot at the lower corner; inner face yellow, with two oblique dusky stripes.

Dimensions.—Length, 1.8 inches; elytra, 1.75 inches; posterior femora, 1 inch; posterior tibiæ, 1 inch.

The colors show this species to be distinct from *A. emarginatum*, which it resembles most.

There is but one specimen in the collection of 1873; no locality given, but it is probably from Arizona.

DICTYOPHORUS Thunb.

Stål has restored this generic name of Thunberg with *R. microptera* as the type. In this he is undoubtedly correct, and should be followed. But when he separates from it those species which have the vertex slightly deflexed, and places them in a new genus, *Tæniopoda*, his desire to form new genera would seem to overcome his better judgment and accurate knowledge of this group. Although it is true that the vertex is somewhat sloped, yet it is but slightly so, and scarcely varies from the line of the anterior part of the pronotum and occiput. An examination of his *T. picticornis*, a specimen of which is now before me, shows that it is congeneric with *R. microptera*, and if removed from association with that genus it must be arbitrarily done. Therefore, while I cheerfully follow Stål in separating the *miles* form from the *microptera* form, I cannot accept his new genus *Tæniopoda*.

DICTYOPHORUS PICTICORNIS, Stål.

Rhomalea pecticornis, WALK., Cat. Dermap. Salt., iii, 538.
Tæniopoda picticornis, STÅL, Recensio, 51.

Walker's specific name would take precedence but for the fact that it is certainly incorrectly printed. For the benefit of American entomologists I give here a somewhat complete description from the specimens before me, as Walker's description is somewhat deficient (as given in my Synopsis), and Stål's not generally accessible.

Female.—Robust; similar in form and size to *R. centurio* (*microptera*) Head depressed; the top from the middle of the occiput to the tip of the vertex sloped slightly downward in a line with the top of the anterior lobe of the pronotum; seen from the side, it forms with the frontal costa an angle of about 110°. Vertex slightly produced in front of the eyes; the sides meeting in a right angle; surface flat; margins slightly elevated. Frontal costa narrow, slightly expanded at the ocellus, obliterated before reaching the clypeus, sharply sulcate. Antennæ somewhat elongate, extending slightly beyond the tip of the pronotum, acuminate; joints distinct. Pronotum slightly expanding posteriorly; the dorsal portion elevated, being arched from the lateral carinæ so that the portion above these equals in height two-thirds the portion below them; the crest forming an obtuse,

slightly elevated carina, arcuate from the middle sulcus forward; lateral carinæ obliterated on the front lobes, distinct on the posterior lobe; transverse incisions distinct, each severing the median carina, the posterior one behind the middle; anterior margin subangulate; posterior margin produced and forming an angle a little less than a right angle; the posterior lateral margins extend almost in a direct (oblique) line from the lower corner to the tip. Elytra and wings in the female about as long as the abdomen, slightly passing it in the male; the former reticulately veined, the veinlets prominent; in the male, these are not only longer but also broader than in the female, and have the cells considerably larger in the apical two-thirds than at the base or in any part of those of the female. Posterior femora reaching the tip of the abdomen in the female, passing it in the male, rather slender as compared with the size of the insect. Upper valves of the ovipositor remarkably robust; apex of the subanal plate of the male strongly curved upward and tapering to a blunt point.

Color (after immersion in alcohol).—Head, thorax, abdomen, and legs shining black, varied with bright yellow; the yellow markings as follows,—a narrow stripe extending down the face on each side just in front of the eyes; face margined with yellow below; a narrow stripe extending from the tip of the vertex along the median carina of the pronotum its entire length; a stripe down each side of the head adjoining the pronotum; posterior lobe of the pronotum margined with yellow; a triangular spot on each side of each abdominal segment; posterior femora with two narrow lines above and two below the disk (carinæ), and the basal half of the disk pinnate with yellow. Antennæ with the two basal and eight or nine apical joints black, the rest yellow, but annulate with black or fuscous at the tips (or joints). Elytra greenish-yellow, the cells or meshes black or dark fuscous. When living the black portions are more or less greenish; the elytra are green or greenish, the meshes black; the wings a bright red; exterior border and the broad front interneural space to the base fuscous, with a red spot (usually) near the apex.

Dimensions.—♀. Length, 2.25 inches; elytra, 1.5 inches. ♂. Length, 1.9 inches; elytra, 1.75 inches.

Several specimens, male and female, are contained in the collection of

1873 obtained in Arizona by Dr. C. G. Newberry. The specimens described by Walker and Stål are from Mexico.

Before leaving this family, I will give a list of the species whose position is affected by Dr. Stål's work so far as I am able to do so at present; but before this can be completed it will be necessary to examine all the species, but, most of my types being now at the Agricultural Department in Washington, I can only give such as are mentioned by Stål and those of which I have specimens before me. I also add the names of the new North American species described by Stål, and in this paper and also those in other papers published since my Synopsis, so as to complete the list of species.

Names according to my Synopsis.	*Names according to Stål's new arrangement.*
Tryxalis brevipennis.	Achurum brevipenne.
Mesops chlorizans.	Arnilia (?) chlorizans.
Opomala bivittata.	Mermiria (?) Belfragii. (Doubtful).
Opomala marginicollis.	Leptysma marginicollis.
Oxycorophus montezuma.	Syrbula montezuma.
{ Pyrgomorpha brevicornis. } { Pyrgomorpha punctipennis. }	Tryxalis brevicornis.
Stenobothrus viatorius.	Scyllina viatoria.
Œdipoda sordida.	Tragocephala sordida.
Œdipoda costalis.	Tragocephala costalis.
Œdipoda discoidea.	Hippiscus discoidea.
Œdipoda phœnicoptera.	Hippiscus phœnicopterus (?).
Œdipoda Haydenii.	Cosmorhyssa Haydenii.
Œdipoda fenestralis.	Psinidia fenestralis.
Œdipoda kiowa.	Psinidia kiowa.
Œdipoda gracilis.	Psinidia gracilis (?).
Œdipoda maritima.	Trimerotropis maritima.
Stenobothrus occipitalis.	Oxycoryphus occipitalis (Brun. Wat.).
Tomonotus sulphureus, &c.	Arphia sulphurea, &c. (?).
Chrysochraon viridis.	Tryxalis viridis (?).
Caloptenus (all).	Pezotettix (?).
Acridium americanum.	Acridium (Schistocerca) americanum.
Rhomalia centurio.	Dictyophorus reticulatus.
Rhomalia pecticornis.	Dictyophorus picticornis (Thos.). Tæniopoda picticornis (Stål.).
Chromacris colorata.	Rhomalea colorata.
Monachidium superbum.	Tæniopoda superba.

List of species to be added to those enumerated in my Synopsis, most of which have been described since its publication.

FROM STÅL'S RECENSIO.

Zoniopoda emarginata	Central America.
Hermistria pulcheipes	Mexico.
Coscineuta virens	West Indies.
Acridium columbinum (Thunb.)	West Indies.
Acridium flavo-lineatum (De G.)	Panama; Mexico.
Achurum acridodes	Mexico.
Mermiria Belfragii (?)	Texas.
Syrbula leucocerca	Texas.
Tryxalis angusticornis (?) Chrysochraon viridis (Scudd.)	Carolina.
Arphia sanguinaria (?) Œdipoda tenebrosa (Scudd.)	Vancouver's Island.
Camnula tricarinata	Vancouver's Island.
Œdipoda Belfragii (?)	Illinois.
Œdipoda punctata	Mexico.
Psinidia capito	Texas.
Psinidia fuscifrons	Texas.

FROM BULLETIN No. 2, U. S. GEOLOGICAL SURVEY OF TERRITORIES (SELF).

Gomphocerus Carpenterii	Colorado.
Thrincus californicus	California.
Ommatolampis brevipennis	New Jersey.
Caloptenus flavolineatus	California.
Caloptenus floridanus	Florida.
Caloptenus keelerii	Florida.
Machærocera sumichrasti	Mexico.

NEW SPECIES DESCRIBED IN THIS PAPER.

Pedioscertetes Nevadensis	Nevada.
Syrbula fusco-vittata	Arizona.
Œdipoda Hoffmannii	Nevada.
Œdipoda Wheelerii	Arizona.
Œdipoda Utahensis	Utah.
Œdipoda sparsa	Arizona.
Eremobia magna	Arizona.
Pezotettix oregonensis	Oregon.
Pezotettix Marshalli	Colorado.
Pezotettix Humphreysii	Arizona.
Caloptenus Yarrowii	Arizona.
Acridium shoshone	Nevada.
Acridium albo-lineatum	Arizona.

LOCUSTIDAE.

There are several species of this family contained in the collection, some of which I am unable to determine at present for want of access to

some works which are necessary. These I have reserved to be described in a subsequent paper.

STENOPELMATUS.

STENOPELMATUS FASCIATUS, Thos.

Stenopelmatus fasciatus, THOS., U. S. Geol. Surv. Terr., 1871, 434.

This species is distinguished by the dark fascia or bands across the abdomen, each segment having one band on it. I have heretofore seen specimens from Texas, Colorado, Wyoming, Utah, and Southern Idaho, to which list of localities may now be added Nevada and Arizona, as shown by this collection.

CEUTHOPHILUS.

There is one specimen of this genus in the collection of 1872, but it is too badly damaged to determine what species it is.

UDEOPSYLLA.

UDEOPSYLLA NIGRA, Scud.

Udeopsylla nigra, SCUD., Jour. Bost. Soc. Nat. Hist., vii, 1862, 443.

There is one specimen of this species, a female, in the collection of 1872. This is the first time I have seen this species; but Dr. Scudder's description is so exact that I feel no doubt as to the correctness of my identification, although the reddish stripe on the back is wanting.

DECTICIDES.

This group is the subject of a paper by Otto Hermann (*Verhand. d. k.-k. zool.-bot. Ges.*, 1874), in which he reviews my arrangement as given in my paper published in Geol. Surv. Terr., 1871, 440.

Although differing from me on some points, yet this author's plan does not vary very materially, so far as the grouping is concerned, from that I have given. But a reference to my paper will show that I considered it as depending too much upon a minor character, and gave it more as a provisional arrangement than otherwise.

Mr. Hermann certainly deserves the thanks of entomologists for disentangling and properly limiting the genera of this group. He not only retains both *Rhacocleis* and *Pterolepis*, which I considered as synonyms, but also adds some new genera. Having access to the fine collection of Dr.

Brunner de Wattenwyl, he has been able to resolve all questions of doubt which I allude to in my paper.

I give the synopsis of his arrangement in his own language, as it is of much interest to our entomologists.

"A. Prosternum mit zwei Stacheln:
*Stiele der lamina subgenitalis eingelenkt, ♂ ; Ovipositor am Ende der Schneide nicht gezähnelt, ♀ :
b. Plantula ganz frei abstehend:
c. Vertex breit zugerundet:
1. Pronotum von der Seite mässig zusammengedrückt, Processus abgestutzt, abgeplattet ..... *Gampsocleis*, Fieb.
2. Pronotum walzig, Processus ausgezogen, zugerundet, ohne Kiel. *Rhacocleis*, Fieb.
cc. Vertex zugespitzt:
3. Pronotum zusammengedrückt, ohne Processus.. *Metaballus*, Herm.
4. Pronotum zusammengedrückt, Processus lanzenförmig zugespitzt, *Rhachidorus*, Herm.
ccc. Vertex mässig erweitert ..... *Thyreonotus*, Serv.
cccc. Vertex verschmälert, mit seichtem Eindruck.... *Arytropteris*, Herm.
bb. Plantula verkürzt, eingezogen:
c. Vertex verschmälert, mit seichtem Eindruck .... *Pterolepis*, Fisch.
cc. Vertex ohne Mitteleindruck, verschmälert..... ... *Drymadusa*, Stein.
AA. Prosternum ohne Stacheln:
*Stiele der lamina subgenitalis eingelenkt, ♂ ; Ovipositor am Ende der Schneide gezähnelt:
b. Plantula ganz frei abstehend:
c. Vertex abgestumpft:
d. Mittelkiel des Pronotums entwickelt..... *Decticus*, Serv.
dd. Mittelkiel des Pronotums nur auf der hinteren Hälfte sichtbar, *Platycleis*, Fieb.
**Stiele der lamina subgenitalis nicht eingelenkt, ♂ ..... *Steiroxys*, Herm.
***Stiele der lamina subgenitalis eingelenkt, ♂ :
b. Pronotum mit Mittelkiel ..... *Psorodonotus*, Brun.
bb. Pronotum ohne Mittelkiel:
c. Tibien des ersten Fusspaares vorne mit zwei Reihen Stacheln, *Anabrus*, Hald.
cc. Tibien des ersten Fusspaares vorne mit einer Reihe Stacheln, *Thamnotrizon*, Fisch."

It will be seen by reference to this synopsis that it corresponds with my arrangement in making the presence or absence of the prosternal spines the chief character separating the two divisions of the group. The author also adopts my distinctions to separate *Anabrus* from *Thamnotrizon*.

My *Decticus trilineatus*, of which some specimens were forwarded to Dr. Brunner de Wattenwyl, is removed to a new genus, *Steiroxys*, established for its reception.

ANABRUS, Hald.

ANABRUS SIMPLEX, Hald.

I find but one specimen of this species in the collection made in Nevada; but from Dr. W. J. Hoffman's letter I presume they were seen in considerable numbers in Central Nevada.

This is the species that is eaten by the Indians. Not only do they eat them after roasting, but often without any other preparation than simply pulling off their legs and head.

ANABRUS PURPURASCENS, Uhler.

The collection contains three specimens, which I am quite confident belong to this species, but at what locality taken does not appear. I have never found or known of it being found west of the main Rocky Mountain range, therefore conclude they are from Colorado or Northern New Mexico.

STEIROXYS, Herm.

STEIROXYS HERMANNII, *sp. nov.*

PLATE XLIV, FIG. 4.

Male.—The dorsal portion of the pronotum, instead of having the margins subparallel as in *St. trilineata*, has them slightly curving inward just in advance of the middle, and then outward from there to the front; the middle dorsal line very minute and subobliterated in front; a slight transverse impression behind the front border; posterior margin truncate, and as given in Mr. Hermann's figure (pl. v, fig. 65); the lateral margins nearly straight, not curved inward at the humerus, and the slope upward more gradual than in *St. trilineata*. Elytra squamæform, extending only across the second segment, rounded to a blunt point at the apex; the two larger cells or areas subequal in the left or upper elytron; the outer area longest; the vein which separates them runs almost directly along the middle of the elytron toward the apex, making a slight sigmoid curve. Super-anal plate with a square notch in the middle, lobes obtusely rounded; cerci rather short, enlarged at the apex, forming a blunt point or angle externally at the tip, while the internal margin of the tip is prolonged into a long, very

sharp, and slightly curved spine equal in length to the cerci, thus L, somewhat in the form of an L, being different from any species in this respect that I am acquainted with; subgenital-plate triangularly but not very deeply notched at the extremity, similar in form to that of *St. trilineata*, the lobes carinated, obtusely pointed. Anterior tibiæ with two spines in front; middle tibiæ with two rows in front, inner row with four, outer two spines; posterior femora with a few minute denticulations along the inferior margin. Spine over the anterior coxæ broad at base, prominent.

Color (after immersion in alcohol).—Purple and yellow. The face dull yellow; pronotum purplish, margined on the sides and posterior extremity with yellow, the purple deepest on the sides; abdomen purple, posterior margin of each segment yellow, forming narrow bands across the abdomen; genital parts yellow.

Dimensions.—Length, 1 inch; pronotum, 0.30 inch; posterior femora, 0.75 inch; elytra, 0.13 inch.

Locality not given. Contained in the collection of 1873.

In general appearance and size, this species is much like *Anabrus Stevensonii*, which will probably have to be referred to this genus, but is quite distinct. It is possible that on account of the abnormal character of the cerci a new genus will have to be formed for its reception; but I am doubtful whether variation in the cerci is sufficient ground for forming new genera. The stylets of the subgenital plate appear to have been broken off in the only specimen I find in the collection.

I have named the species in honor of Mr. Otto Hermann, of Vienna, author of the valuable revision of this group of genera.

STEIROXYS BILINEATA, *sp. nov.*

PLATE XLV, FIG. 7.

Female.—Pronotum very slightly emarginate in front, squarely truncate behind, without any distinguishable carinæ; the dorsal area slightly constricted near the anterior margin, otherwise as in *St. trilineata.* Abdomen proportionally longer and larger than in the latter species, also enlarged in the middle, somewhat fusiform. Cerci short, slender. The posterior abdominal segment with a small, sharp, triangular notch; the lobes in the form of short teeth; the subanal plate with a small, blunt, triangular notch,

the lobes rounded; ovipositor nearly as long as the entire body, slightly curving upward at the apex, not enlarged in the apical portion. Antennæ wanting in the only specimen. Posterior femora slender, smooth, passing the abdomen about one-third of their length. Spines over the anterior coxæ slender. Prosternum unspined; and the meso- and meta-sternal plates small and obtuse.

Color (alcoholic).—Dorsal portions throughout pale olive, striped with yellowish lines. Two rather narrow yellowish lines (one from each eye) extend back along the entire length to the tip of the abdomen; each abdominal segment is margined posteriorly with a quite narrow yellowish line; the lateral margins are marked with a somewhat broader line of the same color. Face and entire ventral surface pale yellow. Legs purplish externally. The olive of the abdomen and pronotum is more or less slightly tinged with rufous near the margins of the spaces.

Dimensions.—Length of body, 1.30 inches; ovipositor, 1.20 inches; posterior femora, 1.25 inches; posterior tibiæ, 1.22 inches.

From the collection of 1874 (October 17). San Carlos; H. W. Henshaw.

The genus *Steiroxys* was established last year by Mr. Otto Hermann, of Vienna, Austria, from some specimens of my *Decticus trilineatus*, which I transmitted to Dr. Brunner Wattenwyl. The specimen now before me corresponds in several respects with the generic characters given by Mr. Hermann, yet the variation in the pronotum and the general appearance of the specimen render it exceedingly doubtful whether it should be placed here.

The tibial spines appear to be the same as in that genus; but as the specimen is somewhat imperfect I cannot speak positively in this respect I have therefore placed it here provisionally rather than establish a new genus on a single and somewhat imperfect specimen.

LOCUSTA.

LOCUSTA FULIGINOSA, Thos.

Locusta fuliginosa, Thos., U. S. Geol. Surv. Terr., 1871, 443.

I find among the dried specimens of the collection of 1872 a female of this species, which was established on a single somewhat imperfect male

specimen presented to me by Dr. Palmer, who obtained it in Arizona. From it I am enabled to set at rest all doubts in regard to the distinction between *L. fuliginosa* and *L. occidentalis*. The specimen before me shows very clearly and beyond dispute that the two are quite distinct; the long wings and elytra and the peculiar color of the wings being the same in the female as the male.

The general color is ashy-white. The occiput is striped longitudinally with white and cinereous; the pronotum is similarly striped on the dorsum, the lower portion of the sides being bordered with yellow. The numerous reticulate veinlets of the elytra are white, giving them the appearance of being sprinkled over with fine white powder. The wings in the female are similar in color and reticulation as described in the male, and as figured by Professor Glover in the report above referred to. The posterior legs (the only ones remaining) are of a pale ash color, with a purplish tinge. Ovipositor ash-brown, curving slightly downward at the apex.

Dimensions.—Length of body about 1.25 inches; length to tip of elytra, 2.25 inches; elytra, 2.0 inches; posterior femora, 1.4 inches; posterior tibiæ, 1.4 inches; ovipositor, 1.25 inches.

As this was the first species of *Locusta* known to our fauna, and the first specimen, badly damaged and alcoholic, this specimen in color, although also somewhat imperfect, is one of the most interesting of the collection to me. It not only enables me to complete my description, but also confirms the view I took in regard to the distinction between this and the one from California.

There are some other specimens of *Locustidæ*, chiefly *Xiphidium* and allied genera, which I am unable at present to determine with certainty; also a few *Gryllidæ* in the same condition; in fact, it is almost impossible to arrive at any certainty in regard to the crickets until there is a revision of this family. I will try and determine them, and report next summer, when I trust I shall have materials for comparison and some works of reference, which I do not have access to at present.

The following specimens having been found in the collections of Orthoptera sent me, are here appended.

ARACHNIDA.

Although not embraced in my specialty, yet as I find one specimen of peculiar interest I desire to make a note of the fact.

TARANTULIDAE.

THELYPHONUS EXCUBITOR, Gir.

Thelyphonus excubitor, GIR., Marcy's Exp. Red Riv. Louis., 265, pl. xvii, f. 1.

The collection contains a fine, almost perfect specimen, of this singular species. The description and figures of Girard are so exact that nothing can be added.

SCORPIONIDAE.

SCORPIO (TELEGONUS) BOREUS, Gir.

Scorpio (*Telegonus*) *boreus*, GIR., Marcy's Exp. Red Riv. Louis., 267, pl. xvii, f. 5.

I find two specimens in the collection which appear to belong to this species, though rather smaller than the one described by Girard. The color of the alcoholic specimens is yellow, but doubtless the greenish cast has faded out.

FIG. 1. ACRIDIUM ALBOLINEATUM. FIG. 2. ACRIDIUM [illegible]
FIG 3. TOMONOTUS TENEBROSUS. FIG 4 PEDIO[illegible]
FIG. 5. EREMOBIA MAGNA

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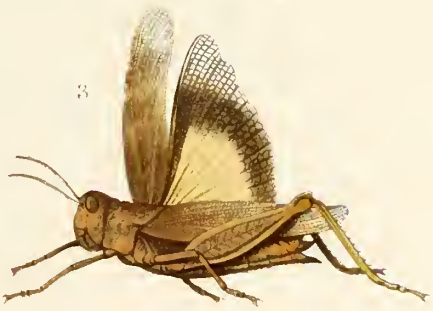

FIG. 1 OEDIPODA WHEELERII FIG. 2 OEDIPODA UTAHENSIS
FIG. 3. OEDIPODA NEGLECTA FIG. 4 STETROXYS HERMANII
FIG. 5. GOMPHOCERUS CARPENTERII

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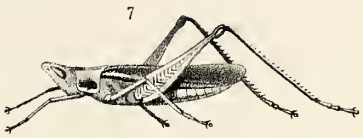

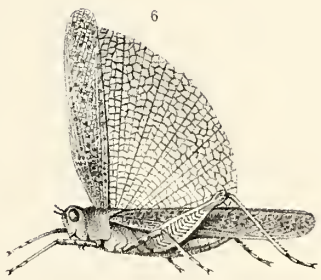

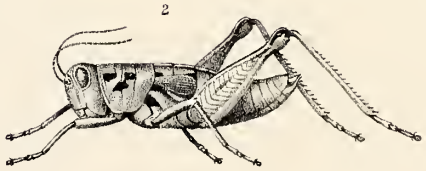

FIG. 1. PEZOTETTIX HUMPHREYSII ♂ FIG. 2 PEZOTETTIX HUMPHREYSII ♀
FIG. 3. PEZOTETTIX MARSHALLII. FIG. 4 PEZOTETTIX UNICOLOR.
FIG. 5. CALOPTENUS YARROWII. FIG. 6. OEDIPODA SPARSA.
FIG. 7. SYRRULA FUSCO-VITTATA.

Note — PEZOTETTIX OREGONENSIS and STEIROXYS BILINEATA originally intended for this plate have been replaced by P. HUMPHREYSII and OEDIPODA SPARSA.

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CHAPTER XIV.

REPORT

UPON

THE COLLECTIONS

OF

NEUROPTERA AND PSEUDO-NEUROPTERA,

MADE IN PORTIONS OF

COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1872, 1873, AND 1874.

BY

Dr. H. A. HAGEN.

CHAPTER XIV.

The collection made by this expedition is somewhat interesting, although small, and in a much damaged condition, partially the result of preserving the specimens in alcohol, which should never be used for this purpose for these insects.

A large portion of the collection of 1874 was unfortunately destroyed by an accident on the Baltimore and Potomac road, which is much to be regretted. Some of the species which are new were collected at the same time by the United States Geological Survey of the Territories in Colorado; and as these specimens were received before those of this expedition they were described in its report for 1873.

FAM. PERLINA.

PTERONARCYS.

PTERONARCYS BADIA, Hagen.

Pteronarcys badia, U. S. Geol. Surv. Terr., 1873, 573–574.

Pale brown; head dull yellowish, with a large square black spot around the ocelli; antennæ brown, paler beneath. Prothorax square, the anterior margin rather rounded, the angles right, pale brown, with darker shading on each on the elevated marks. Abdomen pale above, darker in the middle, pale brown beneath; the apical margin of the penultimate ventral segment largely excised; the dark-brown middle part of the segment somewhat produced, without reaching the last segment; setæ pale-brown; feet darker brown; wings yellowish-hyaline, with a dull-yellow stigma; veins brown.

Length, 17–19 millimeters; alar expansion, 31–33 millimeters.

HAB.—Bridger basin, Wyoming (Garman); Cache Valley, Utah (C. Thomas); Colorado Mountains, August (Lieut. W. L. Carpenter).

The species above described is the dwarf of this genus; the smallest species known, *Pt. proteus*, having twice the length of *Pt. regularis* and *Pt. badia*. The gills are well visible in the alcoholic specimens of *Pt. badia*, twenty-six pairs in number, to wit,—six between the head and the prothorax; six between the prothorax and the mesothorax; six between the mesothorax and the metathorax; two between the posterior feet; and six on the basal segments of the abdomen. The maxillary palpi are longer than the mouth, the basal joint short, the other long, thicker at the tip; the labial palpi are similar. The palpi show a similar formation as the apical joint in the phryganideous genus *Hydropsyche*. The external membrane is cut or split in a somewhat spiral manner, so as to give to every joint the appearance of a large number of small joints imperfectly soldered together. This formation of the palpi belongs to all the species of *Pteronarcys*, and is exceptional for this genus only in the whole family of *Perlina*.

These two small species agree in all characters with the larger species, at least so far as the females are concerned, as the males are still unknown. The wings are divided into quadrangular cells, perhaps a little more regular than in the larger species. The venation of *Pteronarcys* seems to resemble the most the remarkable fossil genus *Miamia*.

Secured at Fairplay and Twin Lakes, Colo., by Dr. J. T. Rothrock.

PTERONARCYS CALIFORNICA, Hagen.

Pteronarcys californica, HAGEN, Synop., 16, p. 5.—*Id.*, Proc. Bost. Soc. Nat. Hist., xv, 284.—*Id.*, U. S. Geol. Surv. Terr., 1873, 573.

A full description is given in the monograph of this genus in the quoted proceedings.

HAB.—California; Washington Territory, between Rock and Cascade Rivers; Lake Winnipeg (Kennicott); Ogden, Utah, from a river tributary to Great Salt Lake, in June (C. Thomas). Nymphæ from the San Luis Valley, Colorado.

According to McLachlan's statement, the wings of the California specimens are very smoky and opaque; perhaps they were darkened by the carbolic acid used by the collectors. *Pt. californica* is a decidedly western species. *Pt. biloba*, from Trenton Falls, N. Y., a species as yet only repre-

sented by the female type in the British Museum, is very nearly related, but, according to McLachlan, a different species.

A specimen (nymph) of this species was secured by Dr. J. T. Rothrock in the San Luis Valley, Colorado.

A species of *Chloroperla* was also taken, but too much damaged to be recognizable.

ACRONEURIA.

An abnormal nymph of this genus, probably *A. abnormis*, was secured at Four-Mile Creek, Lower Park, Colo., by Dr. J. T. Rothrock. In regard to this species the following may be interesting:

ACRONEURIA ABNORMIS, Hagen.

Perla abnormis, HAGEN, Synop., 17, f. 1.

This species appears to vary in a very high degree. The late B. Walsh, after repeated observations of living specimens, confirmed variation in size and color, in the reticulation of the wings, and in the number of quadrangular areoles, which are sometimes nearly or altogether wanting; the shape of the prothorax, and the vulvar lamina of the female, commonly of a constant shape in this family, offer also slight variations in this species.

The male has usually long and well-developed wings; however, two short winged males, now before me, seem to belong to this species. The material in my collection of dry and alcoholic specimens, though rich in specimens from different localities, seems to be not yet sufficient to decide the question whether we have here several very closely related species, or simply varieties of *A. abnormis*.

Two females from South Montana and a male from Snake River, Southeastern Idaho, collected by Prof. C. Thomas, differ as follows:—The colors are darker; the abdomen yellow beneath, on each side dark brown. The male, in worse condition than the females, is a short winged one; the shape of the prothorax somewhat different, perhaps only altered by the bad preservation. The vulvar lamina of the two females is more produced than usual, covering one half of the following segment; the apical margin is nearly semicircular, notched very little in one female, and not at all in the other.

A cast nympha skin, from Eagle River, Colorado, August 30, collected by Lieutenant Carpenter, belongs to a very large species. Length, 33 milli-

meters; setæ, 26 millimeters. There is nothing known concerning the previous stages of the North American *Perlina;* even the different larvæ and skins in my collection are not yet thoroughly studied. After a closer comparison with a nympha skin of *A. abnormis*, communicated by B. Walsh, I believe that the nympha skin from the Eagle River belongs to the same genus, but certainly to a different species. It is not so much spotted; the apical half of the wing cases is pale, without the black band, so conspicuous in *A. abnormis;* the abdomen is dark brown above, without the regular paler marks of *A. abnormis;* the basis of the blackish setæ is pale instead of the throughout dark color of the setæ of *A. abnormis.* Even the size of the skin seems too large for the known American Perlids, except for some very large specimens of *A. abnormis*, collected at the Saskatchewan River.

HAB.—Assuming the above described specimens to belong to *A. abnormis*, this species would have a very wide distribution. The northern limits known are the Saskatchewan and Peel Rivers and Canada; the southern limits, Georgia, and perhaps Mexico. It is known from all Eastern States on the Atlantic, and from many States between the Atlantic and the Rocky Mountains.

DICTYOPTERYX.

DICTYOPTERYX SIGNATA, Hagen.

Dictyopteryx signata, HAGEN, U. S. Geol. Surv. Terr., 1873, 575.

Yellowish-brown, pale beneath; labrum pale brown; head flat, with two irregular brown stripes, with an anterior rounded spot, trilobate behind; space between the stripes with an anterior rounded spot on each side near the eyes. Antennæ pale brown; first joint blackish-brown above, second and third pale; palpi pale. Prothorax as broad as the head, nearly square, brown, with a large, yellow, median band, somewhat dilated at the ends; on each side three carved marks, formed, by rather irregular black, polished scars; lateral margin straight; whitish around the base of the feet; segments darker at the base. Feet pale brown; femora with an external vitta and a ring before the knee; base of the tibiæ and tip of the tarsi dark fuscous. Setæ pale brown, darkest at the tip of the joints. Wings with a grayish-yellow tinge, darker on the costal margin; veins brown, darker,

and very irregular on the tip of the wing, five or four, or even fewer antecubitals; wings of the male as long as the abdomen, or one third or more shorter; the apical ariolets very irregular.

Male.—The last dorsal segment yellow; the apical margin recurvate, transversely cariniform, thickened, emarginate in the middle, scabrous, and rather villous exteriorly; appendages yellow; the superiors are small, recurved lobes; between them the larger inferiors, darker on the triangular tip, which is sharp, and a little emarginate beneath, just before the tip; an ovoid membrane between the inferiors belongs, perhaps, to the penis; last ventral segment produced between the setæ with an elliptical margin.

Female.—Last dorsal segment obtusely produced in the middle of the apical margin, with a median longitudinal impression; vulvar lamina large, rather inflated on the antepenultimate segment, forming two free circular lobes, very near together, beneath the penultimate segment.

Length, with the wings, ♂, 13–17 millimeters; ♀, 18–21 millimeters. Alar expansion, ♂, 16–26 millimeters; ♀, 30–40 millimeters. Length of the setæ, 11 millimeters.

Hab.—Foothills, Colorado, September, and mountains on the Pacific slope, August 16 to September 6.

This genus is new for the American fauna; all species known belong to Europe and Siberia. This new species is far more interesting as an exception, bearing gills in the imago state. There are on the ventral side five pairs of gills, formed by white, fleshy, blind sacs, two pairs on the under side of the head; the first pair widely separated on the basal part of the submentum; the second pair in the articulation with the prothorax; both pairs straight, placed transversely, looking outward. The three other pairs on the thorax always before the feet, but separated from them, being placed just in the articulation of the segments; the three thoracic pairs are incurved.

The occurrence of gills in the imago state of *D. signata* is the more exceptional, as all the hitherto known species are without them; at least, a close examination of dry specimens of all the species in my collection (only one of Siberia is unknown to me) did not disclose anything similar to the gills in *D. signata.* Dr. Gerstaecker, in a recently published paper, also

states the absence of gills in living specimens of *D. intricata* and *D. alpina.* Formerly, the genus *Pteronarcys* was the only known exception for its gill bearing imagos among the class of insects; now, besides the above described *Dictyopteryx*, there are two other gill bearing Perlid genera mentioned by Dr. Gerstaecker—*Damphipnoa litchenalis* from Chili, a genus closely related to *Pteronarcys;* and *Nemura cinerea* and *N. nitida*, with its male, *N. lateralis*, both from Europe.

The papers by Dr. Gerstaecker are published in the *Festschrift zum hundertjährigen Bestehen der Gesellschaft naturforschender Freunde*, Berlin, 1873, 4to, p. 60, with figures; and *Sitzungsbericht derselben Gesellschaft*, October 21, 1873, p. 99.

Taken at Roaring Fork, Colo., by Dr. J. T. Rothrock.

ISOPTERYX.

ISOPTERYX CYDIPPE, Hagen.

Some specimens, much damaged, presumably of this species, were taken in Southern New Mexico in September, 1874, by Dr. O. Loew.

Fam. ODONATA.

OPHIOGOMPHUS.

OPHIOGOMPHUS SEVERUS, Hagen.

Ophiogomphus severus, Hagen, U. S. Geol. Surv. Terr., 1873, 591.

Greenish-yellow; head and mouth parts greenish-yellow; labium and labrum paler; antennæ black; part between the eyes black, forming a transverse black band above the base of the front, excised in the middle; vertex greenish-yellow, flat, the front margin deeply notched, the sides of the vertex cariniform, curved in an exact semicircle around the lateral ocelli; occiput greenish-yellow, with a small, black band along the superior border, beginning near the occiput. Thorax greenish-yellow, an ill defined brownish spot on the dorsum each side near the wings; the crest of the sinus not exceeding the bifurcation, black, and an incomplete blackish band on the humeral suture beginning at the wings.

(Three males and two females from Colorado, in alcohol; a single male from Yellowstone, preserved dry, shows the following pattern):—Dorsum

with a broad, black band in the middle, following the sinus above, and united with a complete black band on the humeral suture. Mesothoracic crest from the bifurcation to the prothorax yellow; a large, ovoid, black spot each side of the dorsum, not confluent with the bands; a black band on the second lateral suture, nearly united by a superior line at the base of the wings with a lateral band; an inferior, incomplete, black band on the first suture, ending at the stigma. Abdomen cylindrical, enlarged at the base, and on the seventh to ninth segments greenish-yellow; all the segments each side on the apical half with a large, blackish band; the bands are interiorly dilated at the tip and converging (diverging on the first segment); venter black on segments 3 to 6, orange on the following. In the Yellowstone male, the bands are broader and confluent on the tip; the yellow part between the bands forming a basal, hastiform spot; appendages yellow, the superiors about as long as the last segment, short, parallel, stout, trigonal, exteriorly rounded, subincurved, pointed on tip, which is bent outward, beneath somewhat thickened before tip, with numerous small, black spines; inferior appendage a little shorter, triangular, bifid to the base, contiguous, the basal half forming an obtuse elevation, the apex recurved with a small, black, superior tooth; genital parts in the second segment with the first hamule forming a lobe interiorly hollowed; the tip with a semicircular excision, the hind angle of the tip prolonged in a strongly bent, slender, black hook; second hamule longer, the tip suddenly narrowed, a little recurved, blackish, cut straight; penis with an inferior tooth on second joint, the last one with two long spines; sheath of the penis hollowed out, four-lobed, the two inner lobes cylindrical, divergent, the outer ones large, flat, semicircular; earlets yellow, large, rounded, on the hand band a series of small, black teeth. The female has the occiput exactly similar to the male, without any posterior teeth; appendages yellow, short, pointed; vulvar lobe triangular, a little shorter than the segment, bifid to the base, contiguous, indented short before the sharply pointed black tip, which is bent outward; feet yellow; femora an apical superior black band, beginning on the knee, divided anteriorly, beneath with numerous, very short, black spines; tibiæ black beneath, and interiorly or on both sides with a black line and long, black spines; tarsi black, all, or only the basal joint, yellow

above; wings hyaline, veins black; the costa and some transversals yellow; pterostigma oblong, a little dilated in the middle, yellowish, darker in the middle, covering nearly three ariolets; 11–12 antecubitals, 7–10 postcubitals; 2 discoidal ariolets; membranula whitish.

Length of the body, 51 millimeters; alar expansion, 64–68 millimeters; pterostigma, $2\frac{1}{2}$ millimeters.

HAB.—Colorado (Mr. James Ridings); foothills and plains of Colorado, end of September (Lieutenant Carpenter); Fort Garland, Colo., June 27; South Montana and Yellowstone (Mr. C. Thomas). This is the species given in my last report (p. 726) doubtfully as *G. colubrinus*. This interesting species is very near *O. colubrinus* in the appendages and genital parts of the male, but different in the pattern of color on the head and abdomen, and the structure of the occiput in both sexes. *O. colubrinus* is a species rarely to be found in collections; even the female is not yet described.

Taken by H. W. Henshaw in 1873, and by Dr. H. C. Yarrow at Fort Garland, Colo., in 1874.

HERPETOGOMPHUS.

HERPETOGOMPHUS COMPOSITUS, Hagen.

Herpetogomphus compositus, HAGEN, Synop., 99, 1.—*Id.*, U. S. Geol. Surv. Terr., 1873, 597.

A female of this species (No. 104 G.) was collected by Dr. H. C. Yarrow in 1874 at San Ildefonso, N. Mex., near the Rio Grande River.

HAB.—Pecos River, Western Texas, Yellowstone region, Oregon, New Mexico.

AGRION.

Some specimens (Nos. 19 and 20) of this genus were collected at Taos, N. Mex., in 1874, by Dr. H. C. Yarrow, but were in such bad condition that it was impossible to determine the species.

ÆSCHNA.

ÆSCHNA CONSTRICTA, Say.

Æschna constricta, SAY, Ent. N. A., 1859, ii, 389 (LeConte's ed.).—HAGEN, Synop., 123, f. 5.—*Id.*, U. S. Geol. Surv. Terr., 1873, 591.

Male and female specimens (No. 273 A) collected at Pagosa Hot Springs, Colo., by Dr. H. C. Yarrow, September, 1874.

HAB.—Common everywhere east of Mississippi, from Canada to Maryland, and west to Wisconsin and British Columbia.

DIPLAX.

DIPLAX COSTIFERA (?).

A number of specimens (Nos. 154 C and 273 A) of this species, both male and female, were collected in New Mexico and Colorado by W. G. Shedd and Dr. H. C. Yarrow.

PLATHEMIS.

PLATHEMIS SUB-ORNATA.

A number of specimens (all in bad condition), male and female, collected in New Mexico by H. W. Henshaw.

MESOTHEMIS.

MESOTHEMIS CORRUPTA, Hagen.

Mesothemis corrupta, HAGEN, Syn. 171, f. 3.—*Id.*, U. S. Geol. Surv. Terr., 1873, 587.

Collected in Arizona by H. W. Henshaw in 1874.

HAB.—Common in Texas, California, and Illinois; Colorado, New Mexico?, Arizona.

LIBELLULA.

LIBELLULA FORENSIS, Hagen.

Libellula forensis, HAGEN, Syn., 154, 9.—*Id.*, U. S. Geol. Surv. Terr., 1873, 585.

A few females of this species were collected in Arizona by H. W. Henshaw in 1874.

HAB.—California, Victoria, Vancouver's Island, British Columbia, Montana, Arizona.

NOTE.—*L. forensis* is very similar to *L. pulchella*, a common species everywhere east of the Rocky Mountains, but may be distinguished from it by being larger and wanting the dark-brown tip of all the wings, besides other differences.

LIBELLULA SATURATA, Uhler.

Libellula saturata, HAGEN, Syn., 152, 4 (*partim*).—UHLER, Proc. Acad. Nat. Sci. Phila., 1857, 88, 4.—HAGEN, U. S. Geol. Surv. Terr., 1873, 586.

Specimens taken at Mineral Springs, Ariz., in 1873, by H. W. Henshaw.

HAB.—Montana, Arizona.

ARGYA.

ARGYA——(?).

Specimens belonging to this genus, but too much damaged for recognition, were taken in 1873 at Camp Apache, Ariz., Fort Wingate, N. Mex., and Fort Garland, Colo., by H. W. Henshaw, and at South Park, Colorado, by Dr. J. T. Rothrock.

HEMEROBINA.

POLYSTOECHOTES PUNCTATUS, Hagen.

Semblis punctata, FABR., Ent. Syst., ii, 73, 4.
Hemerobius nebulosus, FABR., Ent. Syst., Suppl., 202, 1, 2.
Hemerobius irroratus, SAY, Long's Exped. to Rocky Mts., ii, 306.—*Id.*, Asa Fitch's Rep., i, 92.
Polystoechotes sticticus, BURM., Handb., ii, 982, 1.—WALK., Cat., 231, 1.
Osmylus validus, WALK., Cat., 233, 3.
Polystoechotes punctatus, HAGEN, Syn., 206, 1.—*Id.*, U. S. Geol. Surv. Terr., 1872, 729.—*Id.*, *ib.*, 1873, 599.

Collected in 1873 by Dr. J. T. Rothrock at Twin Lakes, Colorado; in 1874, at Tierra Amarilla, N. Mex., and Taos, N. Mex., by Dr. H. C. Yarrow.

HAB.—United States, from Gulf of Mexico to British America, and from the Atlantic to the Pacific.

CHRYSOPA.

CHRYSOPA NIGRICORNIS, Burm.

Chrysopa nigricornis, BURM., Handb., ii, 980, 6.—SCHNEID., Mon. Chrysop., 126, 37, tab. xliii.—WALK., Cat., 259, 50.—HAGEN, Syn., 214, 11.—*Ib.*, U. S. Geol. Surv. Terr., 1873, 599.
Chrysopa colon, FITCH, Rep., 1, 88.

Collected at Pagosa Hot Springs, Colo., at Taos and San Ildefonso, N. Mex., by Dr. H. C. Yarrow, and at Pueblo, Col., by C. E. Aiken.

HAB.—Carolina, New York, New Mexico, and Colorado.

CHRYSOPA EXPLORATA, Hagen.

Chrysopa explorata, HAGEN, Syn., 217, 18.

Collected in New Mexico by Dr. O. Loew in 1874.

HAB.—Mexico and New Mexico.

CHRYSOPA EXTERNA, Hagen.

Chrysopa externa, HAGEN, Syn., 221, 32.—*Ib.*, U. S. Geol. Surv. Terr., 1873, 599.

Some specimens in very bad condition collected in New Mexico by Dr. O. Loew.

HAB.—Washington Territory, New Mexico, Mexico, California.

CORYDALIS.

One larva of this genus from the Colorado Chiquito, collected in 1873 by H. W. Henshaw.

The larva differs from those of *C. cornuta* by a larger prothorax, luteous legs, and the mark of the head. There are now six species known from Texas and New Mexico; of course, it is still impossible to ascertain the species of the larva from Colorado, but probably it may belong to one of the three Texan species (U. S. Geol. Surv. Terr., 1873, 579, 600).

NOTE.—This specimen was inadvertently attributed to Professor Hayden's collection in the work quoted above.

RAPHIDIA.

The genus *Raphidia* belongs to the interesting class of genera which are represented largely in Europe and Asia, are entirely wanting in the fauna of North America east of the Rocky Mountains, but are represented again in California and in the other vast tracts of land west of the Rocky Mountains. I have seen only two specimens, one from Ogden, Utah (C. Thomas), the other from Rio Grande, Colorado, June 13 (collected by this expedition). Both belong to different species, and to *Raphidia* proper (not to *Inocellia*). Both being preserved in alcohol, I am not able to give any better information, the more so as the genus *Raphidia* contains the most difficult species for determination (U. S. Geol. Surv. Terr., 1873, 600).

MYRMELEON.

MYRMELEON INSCRIPTUS, Hagen.

Myrmeleon inscriptus, HAGEN, Syn., 230, 11.

A number of individuals supposed to be of this species were secured at Taos, N. Mex., San Ildefonso, N. Mex., Pagosa, Colo., Pueblo, Colo., by Dr. H. C. Yarrow and C. E. Aiken. They were in such bad condition, however, as to render a positive identification impossible.

PHRYGANINA.

Some specimens belonging to this genus were secured by Dr. J. T Rothrock at Twin Lakes, Colorado, in 1873, and may possibly be *P. atripes.* They were, however, in such bad condition as to render a careful study almost impossible.

In addition, some specimens of *Limnophilus* were obtained, also in a damaged condition.

ERRATA.

Reptiles and Batrachians.

Page 619, 14th line from bottom, for "O. pyromelas," read "O. pyrrhomelas."

Fishes.

Page 673, 9th line from top, after the word "proper," read "with."
Page 677, for "Alticolus," read "Alticolum."
Page 678, for "Fecundus," read "Fecundum."

Diurnal Lepidoptera.

Page 762, 10th line from bottom, for "Phyciodes," read "Melitæa."
Page 763, 6th and 11th lines from top and 13th line from bottom, for "Phycioles," read "Eresia."
Page 786, 17th line from top, for "Epargyreus," read "Eudamus."
Page 792, under "Anthocharis," for "A. Ausonoides," read "A. Ausonides."

Zygænidæ.

Page 798, *dele* "Cochlidiinæ."
Page 799, 16th and 17th lines from top, *dele* "Zygænidæ" and "Castniinæ."
Page 802, 11th line from top, insert "Zygænidæ" before "Melanchroia."

Coleoptera.

Page 816, for "Straphylinidæ," read "Staphylinidæ."
Page 820, for "Lamphyridæ," read "Lampyridæ."

Orthoptera.

Page 863, 5th line from top, for "my Tr. pacifica," read "Scudder's Œlipoda atrox."
Page 863, 16th line from top, for "Tremerotropus," read "Trimerotropus."
Page 870, under "Syrbula fusco-vittata," for "Plate XLIII, fig. 5," read "Plate XLV, fig. 7."
Page 871, for "Leucocerca," read "Leucocera."
Page 873, 10th line from top, for "Pedioscertetis," read "Pedioscertetes."
Page 886, under "Eremobia magna," for "Plate XLV, fig. 1," read "XLIII, fig. 5."
Page 888, under "Pezotettix unicolor, Plate XLV," for "fig. 5," read "4."
Page 888, under "Pezotettix oregonensis, Plate XLV," for "figs. 2 and 3," read "1 and 2."
Page 889, under "Pezotettix Marshallii, Plate XLV," for "fig. 4," read "3."
Page 894, under "Caloptenus Yarrowii, Plate XLV," for "fig. 6," read "5."
Page 900, 17th line from top, for "Oxycorophus," read "Oxycoryphus."
Page 900, 11th line from bottom, for "Trimerotropis," read "Trymerotropus."
Page 901, 11th line from top, for "S. Leucocerca," read "leucocera."
Page 901, 8th line from bottom, for "P. Marshalli," read "P. Marshallii."
Page 905, under "Steiroxys bilineata," Plate XLV, for "fig. 7," read "6."
Page 918, 10th line from top, for "G. colubrinus," read "O. colubrinus.

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